

madBlocks
Technology:Innovation:Business

Solidity Programming, a language to create Smart Contracts on Ethereum

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mad@madblocks.tech

For questions, write us on blockchain@madblocks.tech



Agenda

Session – 1: Short Tour on the Blockchain

- Why is Blockchain?
- What is Blockchain?
- Tools Needed for this workshop
- Pre-Requisites

Session – 2: Creating your First Crypto Wallet

- Starting Ganache
- Configuring Metamask with Ganache
- Importing some accounts into metamask
- Making some transactions

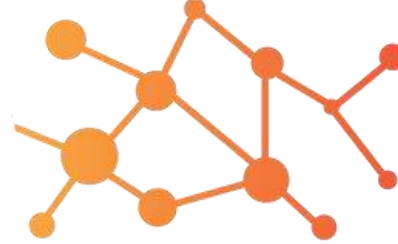
Session – 3: Smart Contracts

- Smart Contracts
- Creating the first smart contract
- Deployment onto the Ganache
- Demonstration of some Dapps





Session – 1: Short Tour on Blockchain



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Why we need a Blockchain?

- Our take on Blockchain

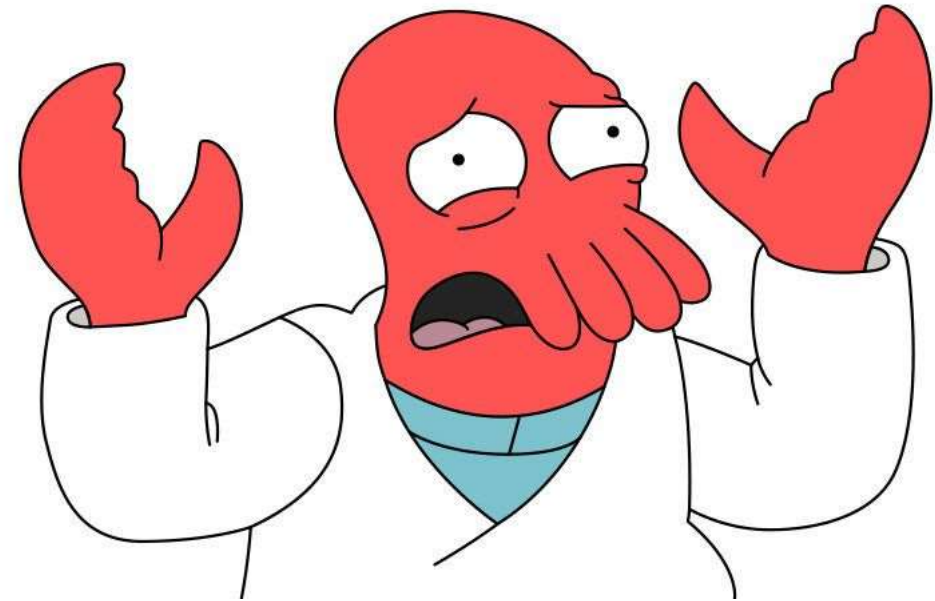
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Why the hell is this?

Top 2 quick scenarios

- Data Security
- Centralized Server

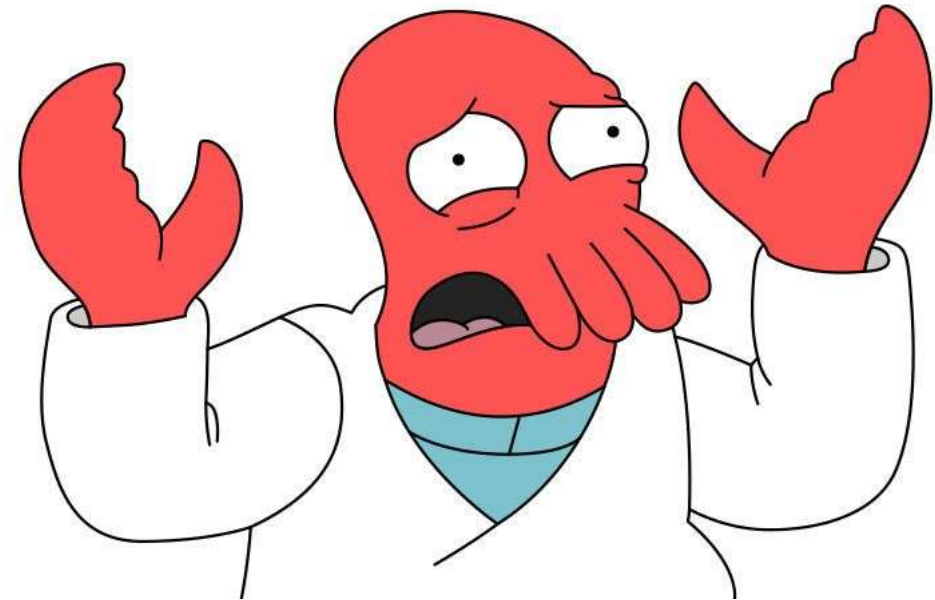




Why the hell is this?

Top 2 quick scenarios

- **Data Security**
- Centralized Server





Data Security

Is your data secured?

- Can you guarantee that your data stored in a third party server is secured enough?





Data Security

Is your data secured?

- Can you guarantee that your data stored in a third party server is secured enough? **NO**





Data Security

Is your data secured?

- Can you guarantee that your data stored in a third party server is secured enough? **NO**
- Do you have a control on your own data when it is openly available?





Data Security

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Data Security

Is your data secured?

- Can you guarantee that your data stored in a third party server is secured enough? **NO**
- Do you have a control on your own data when it is openly available? **NO**
- Does your data have privacy in the internet world?





Data Security

Is your data secured?

- Can you guarantee that your data stored in a third party server is secured enough? **NO**
- Do you have a control on your own data when it is openly available? **NO**
- Does your data have privacy in the internet world? **NO**





Data Security

What you need?

- If your data is difficult to hack, then obviously you can say that your data is secured.
- If someone wants to access your data, you have to allow them with a token (cryptographic key) then it means that you have a control on your own data.
- Though data is open to public, they can view but they can't understand what is that data all about. Hence, privacy is given.

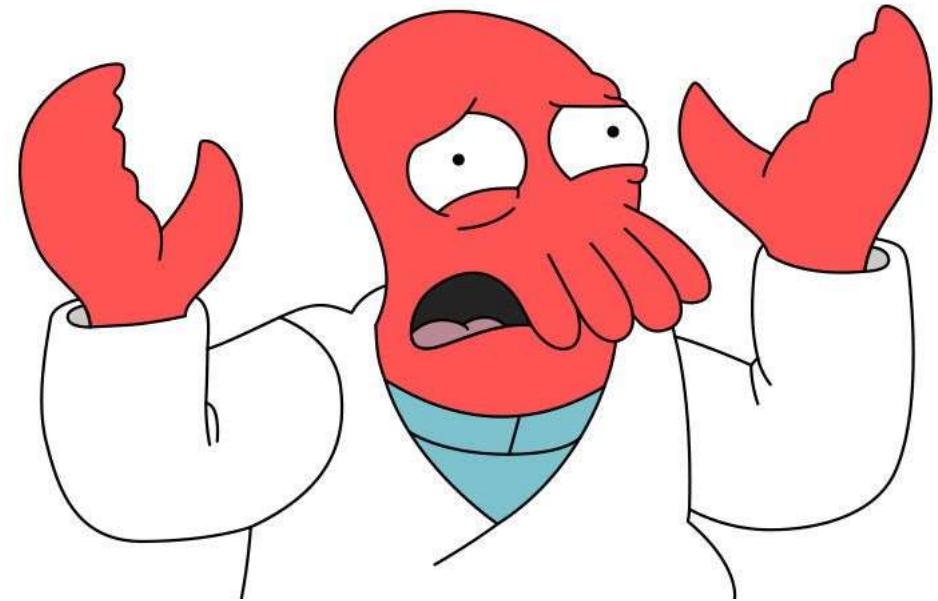
#1. Blockchain gives this kind of security to your data.



Why the hell is this?

Top 2 quick scenarios

- Data Security
- **Centralized Server**



Centralized Server

Is a centralized server a superman?

– If your server goes down, are you in a position to access your own data?



Centralized Server

Is a centralized server a superman?

– If your server goes down, are you in a position to access your own data?

NO



Centralized Server

Is a centralized server a superman?

- If your server goes down, are you in a position to access your own data? **NO**
- Does someone is taking control on your data?



Centralized Server

Is a centralized server a superman?

– If your server goes down, are you in a position to access your own data?

NO

– Does someone is taking control on your data?

YES



Centralized Server

Is a centralized server a superman?

– If your server goes down, are you in a position to access your own data?

NO

– Does someone is taking control on your data?

YES

– Do you think that distributed computing itself will safeguard our data in a centralized system?



Centralized Server

Is a centralized server a superman?

– If your server goes down, are you in a position to access your own data?

NO

– Does someone is taking control on your data?

YES

– Do you think that distributed computing itself will safeguard our data in a centralized system?

NO



Centralized Server

Centralized, Distributed, Decentralized

- Centralized systems directly control the operation of the individual units from a single center.
- Distributed means computation is spread across multiple nodes instead of just one.
- Decentralized means no node is instructing any other node as to what to do.

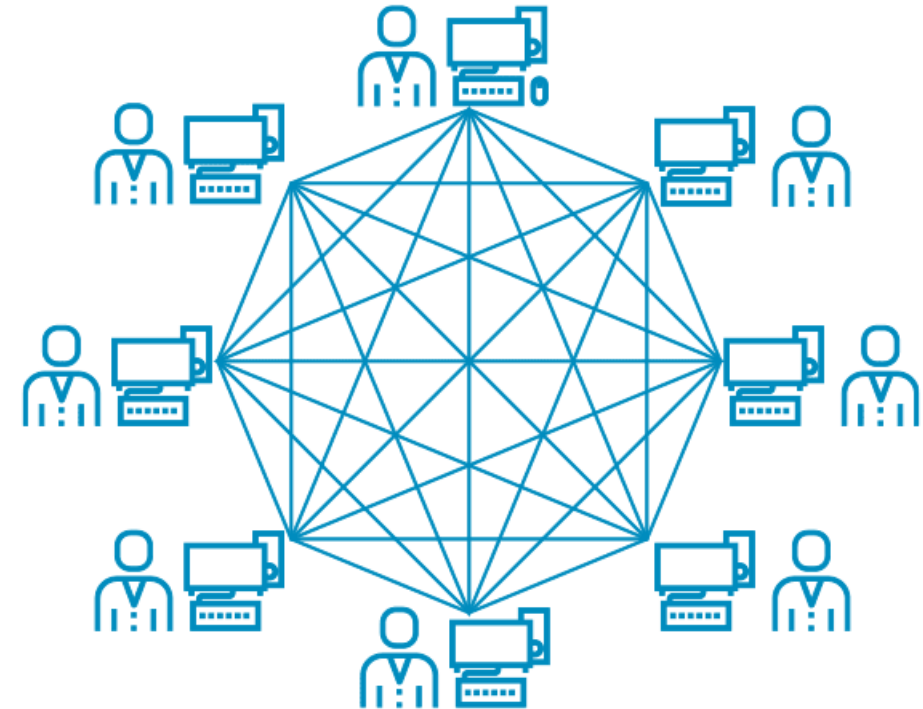
#2. Blockchains are Decentralized and Distributed across P2P Network



What Blockchain gives us?

Key Benefits

- Tamper-free
- More difficult to hack
- Decentralized and Distributed across P2P
- Trust
- Transparency

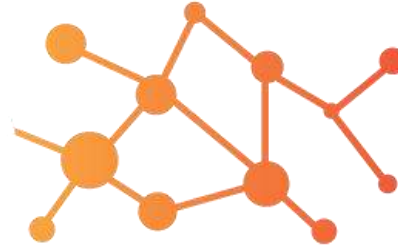


Summary

Pack-Up!

- We gone through the key benefits of using Blockchain in our application development.
- Use Blockchain instead of general database server to store your data.
- Blockchain integrated with Cyber Security gives lot of scope in strengthening our data.

**THANK
YOU!**



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What is Blockchain?

- Our take on Blockchain

For questions, write us on blockchain@madblocks.tech



What is Blockchain ?

Blockchain is the next avenger;

- Blockchain is a Distributed Ledger Technology (DLT) decentralized on a peer to peer network.
- Ledger is like a complete information about the blocks that gets appended on to the chain.
- Due to its transparency and tamper-free, blockchains are being used in different verticals.
- Blockchains are immutable, thereby the data that gets stored in it is one-time writable.





Bitcoin

Bitcoin

- Bitcoin is a digital currency, which is used and distributed electronically.
- It is a decentralized peer-to-peer network. No single bank institution or person controls it.
- Bitcoin is the first cryptocurrency which used Blockchain technology and hence, people started calling it as blockchain, but it is not;
- Bitcoin has the open-source public distributed ledger in p2p network called Blockchain





Ethereum

Ethereum

- Ethereum is the second-largest cryptocurrency platform by market capitalization, behind Bitcoin.
- It is a decentralized open source Blockchain featuring smart contract functionality.
- Ether is the cryptocurrency generated by Ethereum miners as a reward for computations performed to secure the Blockchain



ethereum



Types of Blockchains

Public Blockchain

In this type of Blockchain, ledgers are visible to everyone on the internet. It allows anyone to verify and add a block of transactions to the Blockchain. Public networks have incentives for people to join and free for use. Anyone can use a public blockchain network.

Private Blockchain

The private blockchain is within a single organization. It allows only specific people of the organization to verify and add transaction blocks. However, everyone on the internet is generally allowed to view.

Consortium Blockchain

In this Blockchain variant, only a group of organizations can verify and add transactions. Here, the ledger can be open or restricted to select groups. Consortium blockchain is used cross-organizations. It is only controlled by pre-authorized nodes.



Basic Building Blocks of Blockchain

1. P2P Network, Node/Peer
2. Miners
3. Hashing
4. Transactions
5. Block
6. Public and Private Keys (Digital Signature)
7. How Blockchain works?



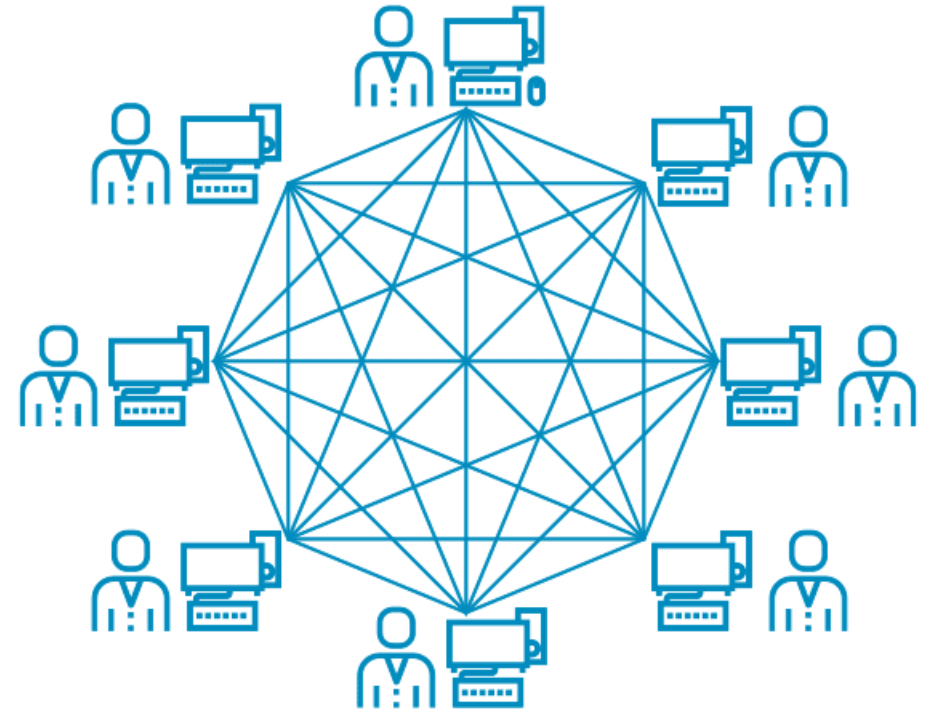
BLOCKCHAIN



P2P Network

Decentralized and Distributed;

- Each node in the P2P network is called a peer who maintains the entire network.
- The person who maintains the network can able to mine the transaction.
- All the information would be duplicated across the P2P network, it means that all the peers will have same information.





Miners

Someone who maintains the network;

- Each miner in the network maintains the entire full node (The nodes would be of type full and half nodes).
- Every miner will compete with other miners of the network to add a block to the blockchain.
- These miners will agree on a consensus algorithm to get the incentives and add block to the blockchain.





What is Hashing?

What is Hashing?

- Hashing is a process of converting a data/piece of information to a Cryptographic value
- From the Cryptographic value, we can't convert back to the text .i.e. it is one-way function

Text I/P: **Madblocks is rocking**

Hash: **f384a135c4ac27a017139c29b0a84c2b408377cca74a81840fe92da5851d95cf**

Text I/P: **Madblocks is rocking.**

Hash: **35628c955e794344927a4a1a8f289c49d9f3c5e0a911cc97636404d8677893c8**

If you change input, then hash is going to be changed



What is transaction?

What is transaction?

- Generally, the processing of a request alias purchase or sell which takes place in the digital world is called as transaction.
- In financial domain, the transactions will be holding some details like credit/debit that taken place between the entities.
- As per me, any kind of request that you make in the Blockchain Infrastructure is a transaction need not be only a money transaction but can be anything.





Digital Signature

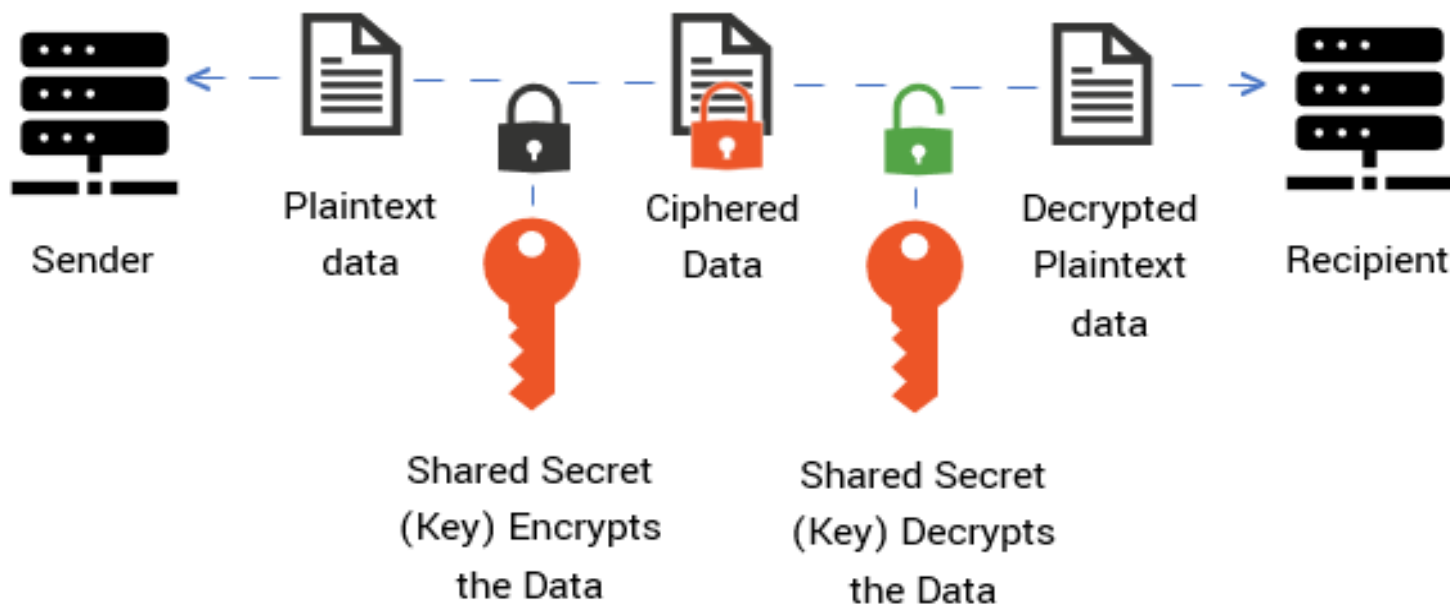
Signature created through Keys

- Private Key Cryptography
- Public Key Cryptography



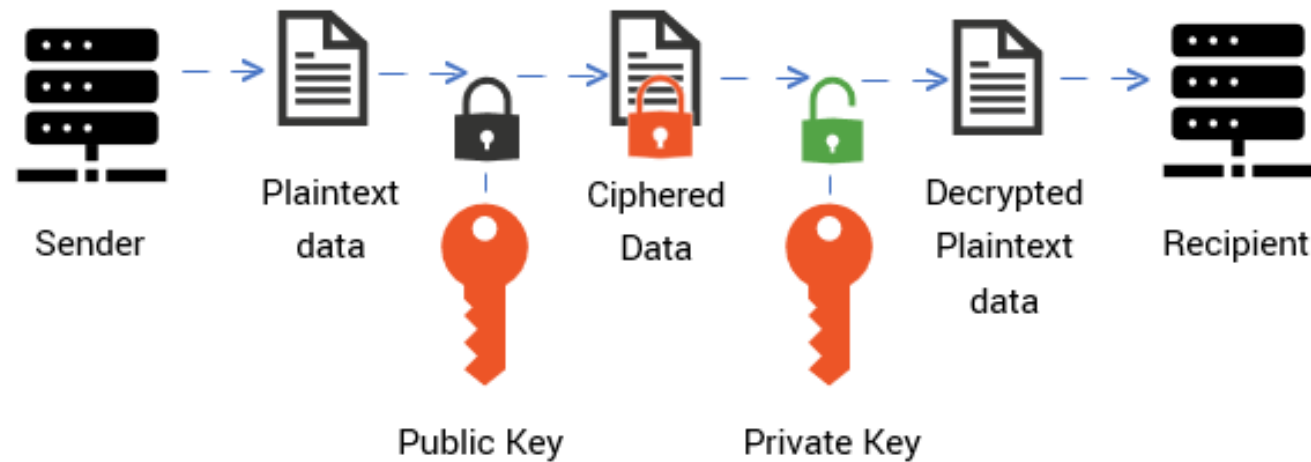


Private Key Encryption (Symmetric)





Public Key Encryption (Asymmetric)





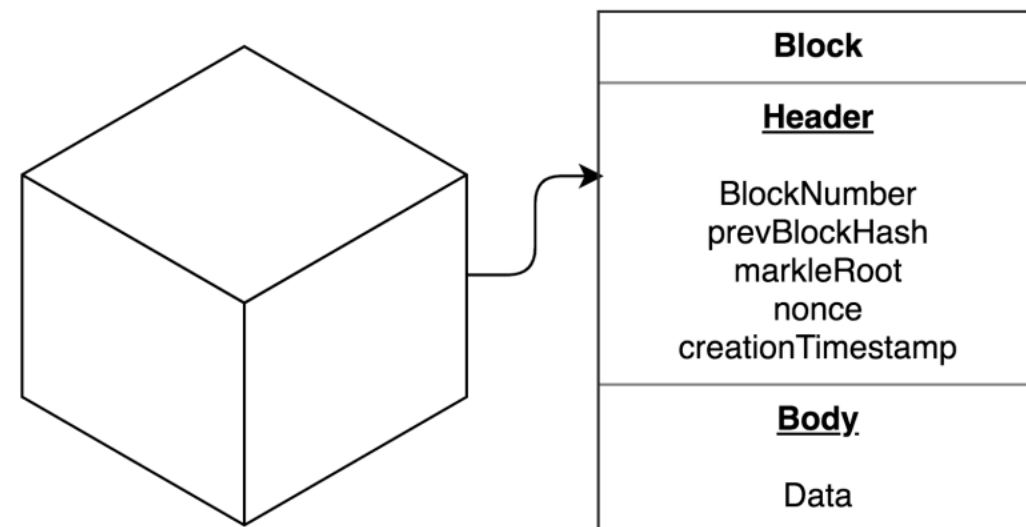
What is Block?

Block

- Whenever a transaction request added to unconfirmed transactions list, then that transaction will be broadcasted to all the peers
- All the peers will be validating the block and based on some consensus algorithm, they are going to add the block to the Blockchain network

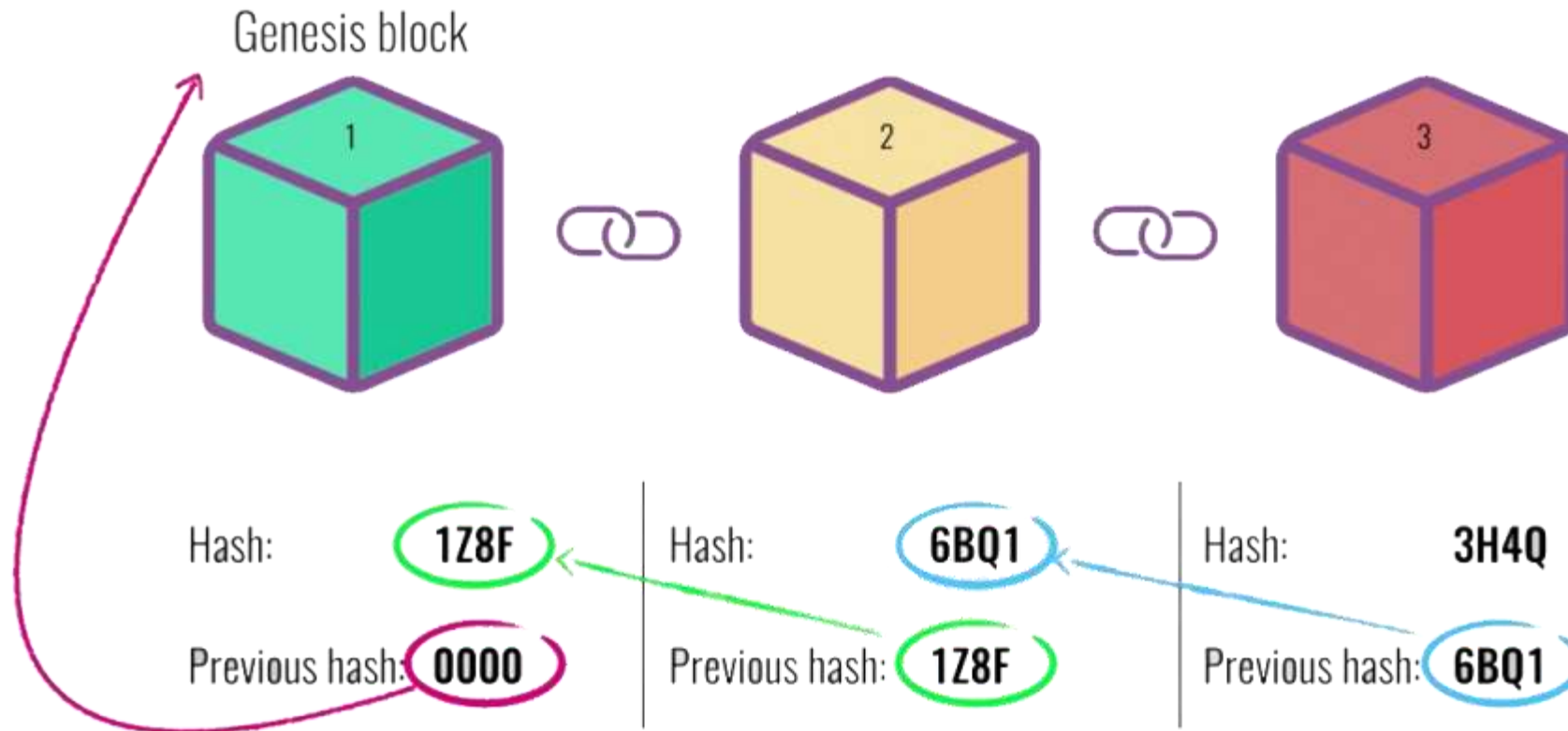
A Block would be comprised of

- Timestamp
- Transaction
- Current Hash
- Previous Hash
- Nonce



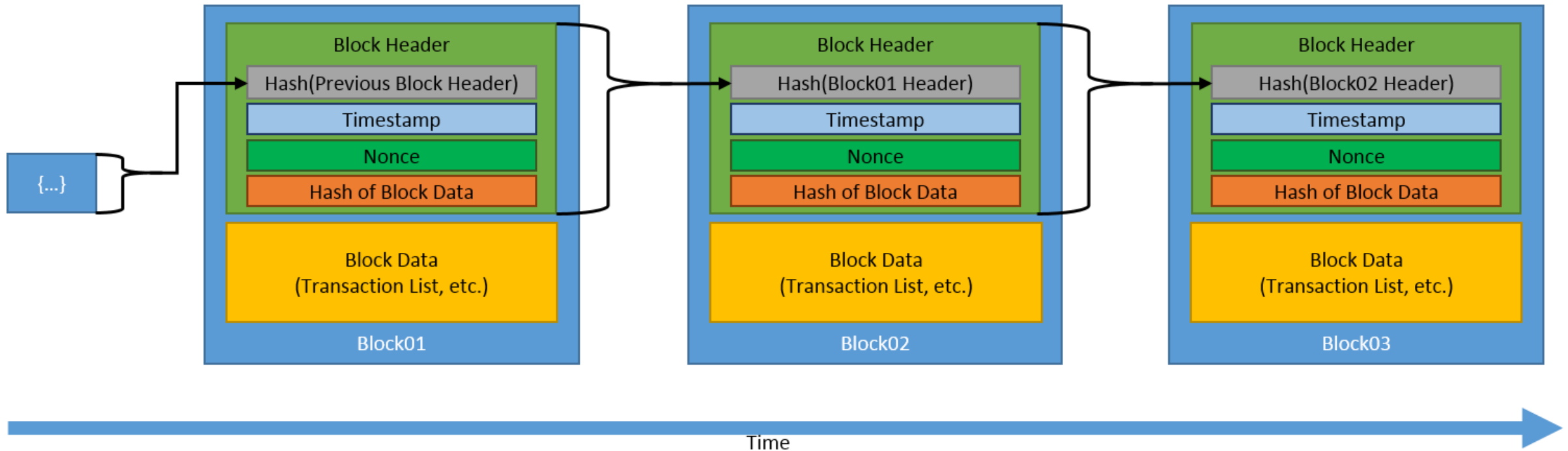


How Blocks are connected in Blockchain?





How Blocks are connected in Blockchain?





A Scenario of Blocks in the Blockchain



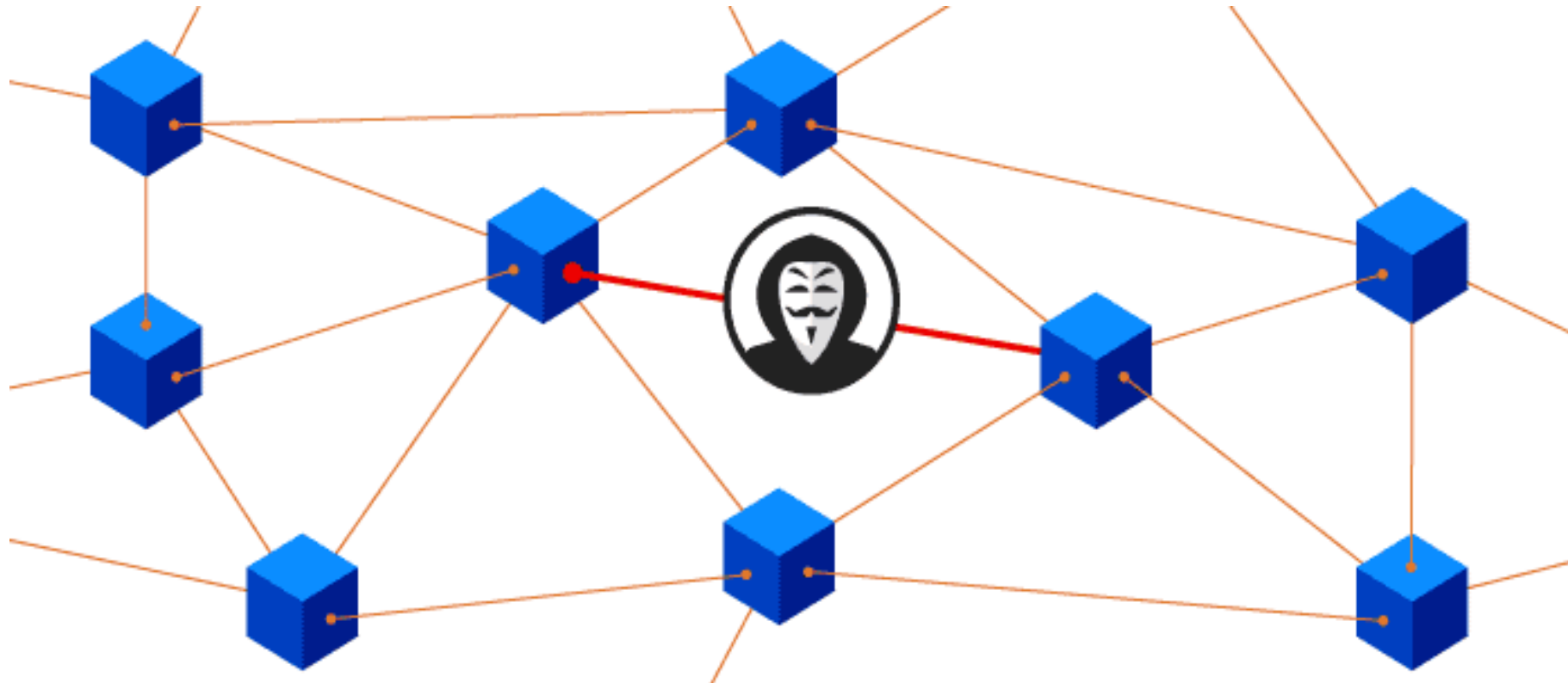


A Scenario of Blocks in the Blockchain





Hacking is possible only
when hacking is done on all the peers





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Someone requests a transaction.



The requested transaction is broadcast to a P2P network consisting of computers known as **nodes**.



The P2P network of nodes validates the transaction and the user's status using known algorithms.



A verified transaction can involve **cryptocurrency**, contracts, records, or other information.



Cryptocurrency



Has no **intrinsic value** in that it is not redeemable for another commodity.



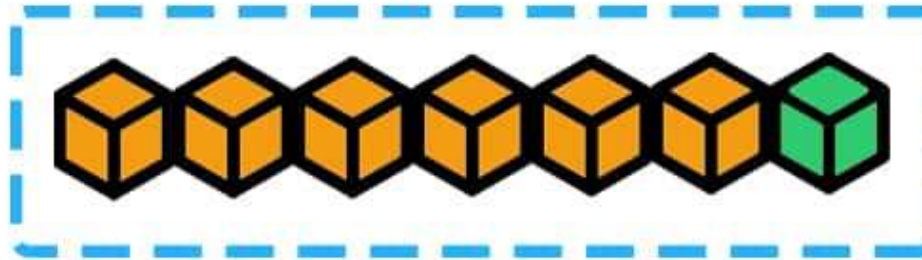
Has no physical form and exists **only in the network**.



Its supply is not determined by a central bank, and the network is **completely decentralized**.



The transaction is complete!



The new block is then added to the existing blockchain in a way that is **permanent and unalterable**.

Once verified, the transaction is combined with other transactions to create a new **block of data** for the ledger.

How Blockchain Works?



Blockgeeks

For questions, write us on blockchain@madblocks.tech

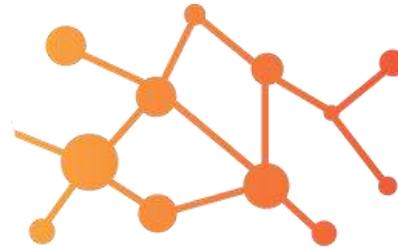


Summary

Pack-Up!

- We gone through what is blockchain and the basic building blocks of Blockchain.
- Blockchain is a distributed ledger technology decentralized on a P2P network.
- The data (transactions) are encrpyted, though they are open to public they can't understand what the data is all about.

**THANK
YOU!**



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Tools & Pre-Requisite

For questions, write us on blockchain@madblocks.tech

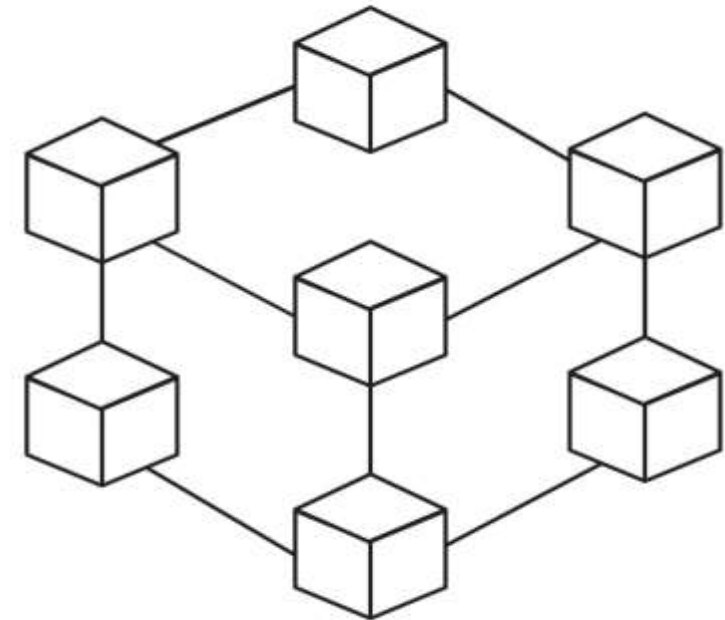


Tools of today's session

Solidity Compiler



Solidity is an object-oriented programming language for writing smart contracts. It is used for implementing smart contracts on various blockchain platforms, most notably, Ethereum.



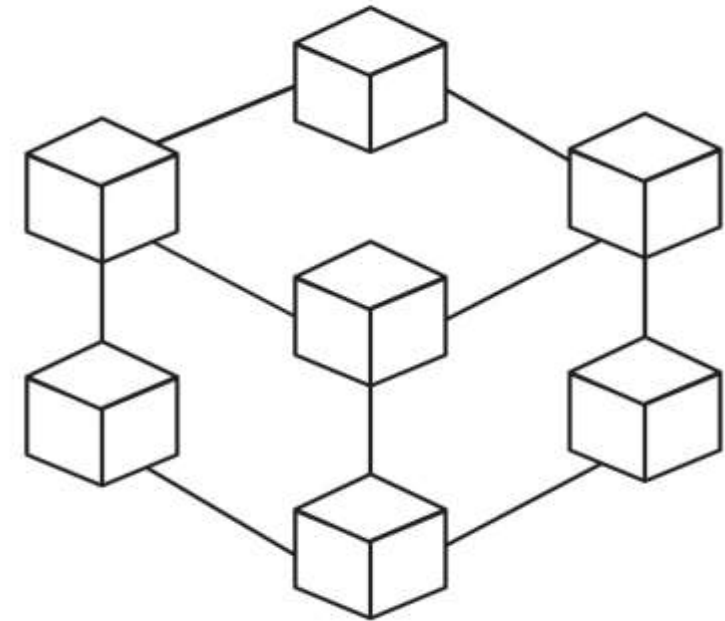


Tools of today's session

Metamask Wallet



MetaMask is a free and secure browser extension that allows web applications to read and interact with the Ethereum blockchain.





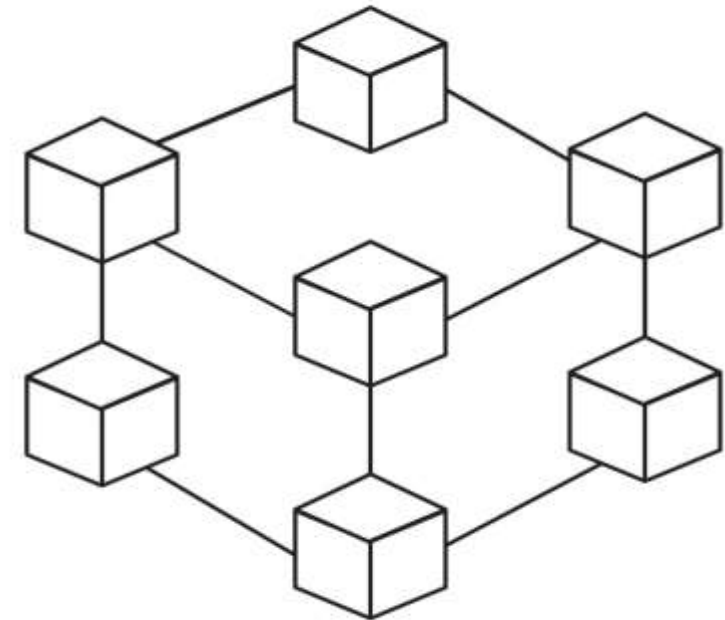
Tools of today's session

Ganache Blockchain



Ganache

Quickly fire up a personal Ethereum blockchain which you can use to run tests, execute commands, and inspect state while controlling how the chain operates.





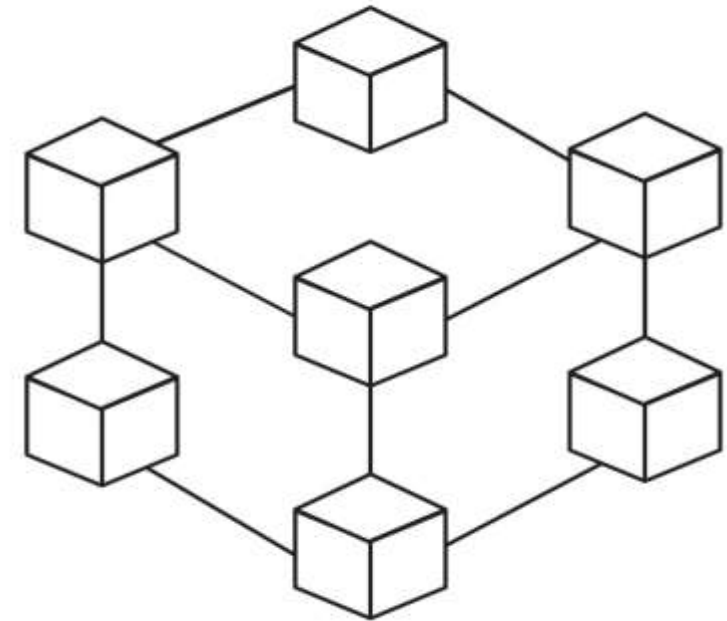
Tools of today's session

Ethereum Networks



ethereum

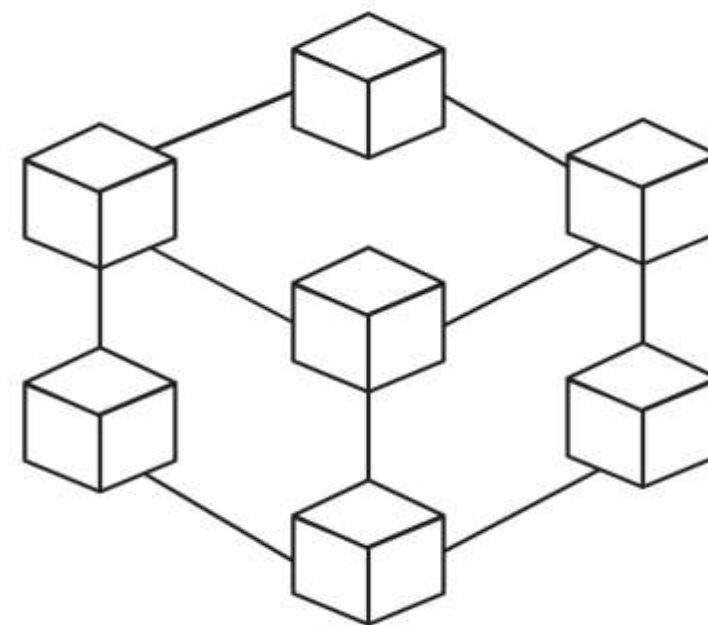
Ethereum is the second-largest cryptocurrency platform by market capitalization, behind Bitcoin. It is a decentralized open source blockchain featuring smart contract functionality.





Prerequisites of today's session

1. Basic programming knowledge on any **object-oriented programming**.
2. **Laptop/Desktop PC with minimum of**
4GB RAM,
500GB of Hard Disk,
1GB of Graphics Card,
Internet Connectivity upto 20Mbps.
3. **Ubuntu OS / Windows** (Ubuntu
Recommended for Blockchain Applications)





Summary

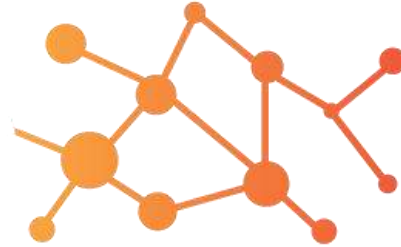
Pack-Up!

- We have gone through what kind of tools are required for doing hands-on and a pre-requisite needed.
- Solidity – Programming Language
- Remix – Web IDE
- Ganache – Local Ethereum Blockchain Server
- Metamask – Crypto Wallet

THANK YOU!



Session – 2: Creating your Crypto Wallet



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How to launch Ganache Blockchain Server on Ubuntu OS?

For questions, write us on blockchain@madblocks.tech



Launching Ganache Blockchain

Important Steps

- Download the Ganache Server from truffle suite.
- www.trufflesuite.com/ganache
- Download it and Launch.



Ganache



Ganache

ONE CLICK BLOCKCHAIN

GITHUB REPO

DOCS

Star

2,294

Quickly fire up a personal Ethereum blockchain which you can use to run tests, execute commands, and inspect state while controlling how the chain operates.

DOWNLOAD
(LINUX)

Need another OS download?





Ganache

ONE CLICK BLOCKCHAIN

[GITHUB REPO](#)[DOCS](#)[Star](#)[2,294](#)

Quickly fire up a personal Ethereum blockchain which you can use to run tests, execute commands, and inspect state while controlling how the chain operates.

DOWNLOAD
(LINUX)



[Need another OS download?](#)



ganac....ApplImage

3.6/146 MB, 12 mins l...



The file will be downloaded as this



ganache-2.4.0-linux-
x86_64.AppImage

Double Click on this, and Ganache Server opens...



Ganache

v2.4.0

CREATE A WORKSPACE

Quickstart for a one-click blockchain or create a new workspace for advanced setup options.



QUICKSTART
ETHEREUM



NEW WORKSPACE
ETHEREUM

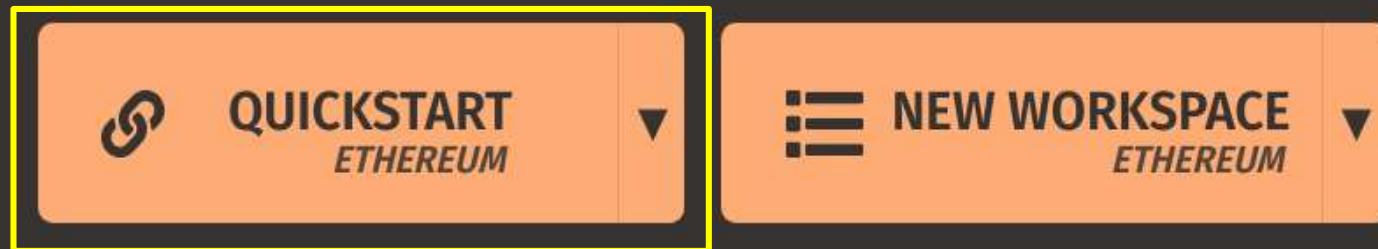




Ganache
v2.4.0

CREATE A WORKSPACE

Quickstart for a one-click blockchain or create a new workspace for advanced setup options.



Click on Quickstart Button to launch



Ganache

ACCOUNTS

BLOCKS

TRANSACTIONS

CONTRACTS

EVENTS

LOGS

UPDATE AVAILABLE

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK0

GAS PRICE20000000000

GAS LIMIT6721975

HARDFORKMUIRGLACIER

NETWORK ID5777

RPC SERVERHTTP://127.0.0.1:7545

MINING STATUSAUTOMINING

WORKSPACE QUICKSTART

SAVE

SWITCH

MNEMONIC ?

HD PATH

coach color spin defense amazing ladder board palace palace stereo famous defy

m/44'/60'/0'/0/account_index

| | | | | |
|--|------------|----------|-------|--|
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0xF2bE4Cf9e79D695268E8085ee3aa42600aB73f96 | 100.00 ETH | 0 | 0 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x249147D4AD0D2F11Cff3bD9BdcA0E7dC34761e58 | 100.00 ETH | 0 | 1 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x77dFDDE1F4B988129b5ae5D88Be3630534D19e2c | 100.00 ETH | 0 | 2 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x5433C19110A73080c29609778c5830F435c21D02 | 100.00 ETH | 0 | 3 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0xD45e65d68D776d85B707B98998fc05e931caF53E | 100.00 ETH | 0 | 4 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x7390923332955bdb14AAE3F0e9cd4691816B165f | 100.00 ETH | 0 | 5 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x90893Ff584AeDA160835672E5D160430Df2A2fa3 | 100.00 ETH | 0 | 6 | |



CURRENT BLOCK
0

GAS PRICE
20000000000

GAS LIMIT
6721975

HARDFORK
MUIRGLACIER

NETWORK ID
5777

RPC SERVER
HTTP://127.0.0.1:7545

MINING STATUS
AUTOMINING

WORKSPACE
QUICKSTART

SAVE

SWITCH



MNEMONIC ?

coach color spin defense amazing ladder board palace palace stereo famous defy

HD PATH

m/44'/60'/0'/0/account_index

ADDRESS

0xF2bE4Cf9e79D695268E8085ee3aa42600aB73f96

BALANCE

100.00 ETH

TX COUNT
0INDEX
0

ADDRESS

0x249147D4AD0D2F11Cff3bD9BdcA0E7dC34761e58

BALANCE

100.00 ETH

TX COUNT
0INDEX
1

ADDRESS

0x77dFDDE1F4B988129b5ae5D88Be3630534D19e2c

BALANCE

100.00 ETH

TX COUNT
0INDEX
2

ADDRESS

0x5433C19110A73080c29609778c5830F435c21D02

BALANCE

100.00 ETH

TX COUNT
0INDEX
3

ADDRESS

0xD45e65d68D776d85B707B98998fc05e931caF53E

BALANCE

100.00 ETH

TX COUNT
0INDEX
4

ADDRESS

0x7390923332955bdb14AAE3F0e9cd4691816B165f

BALANCE

100.00 ETH

TX COUNT
0INDEX
5

ADDRESS

0x90893Ff584AeDA160835672E5D160430Df2A2fa3

BALANCE

100.00 ETH

TX COUNT
0INDEX
6

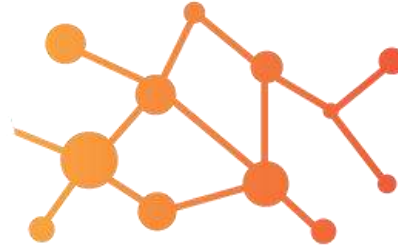


Summary

1. We have downloaded the Ganache from truffle and we had quickly launched the Ganache Blockchain (Local Ethereum) Server.
2. We had identified the IP address of server along with port number as follows:

<http://localhost:7545>

**THANK
YOU!**



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How to add Metamask to Google Chrome?

For questions, write us on blockchain@madblocks.tech



METAMASK



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What is MetaMask?

A crypto wallet and gateway to Blockchain Apps

MetaMask provides the simplest yet most secure way to connect to Blockchain-based applications.

MetaMask generates passwords and keys on your device, so only you have access to your accounts and data.

MetaMask provides an essential utility for Blockchain newcomers, token traders, crypto gamers and developers.





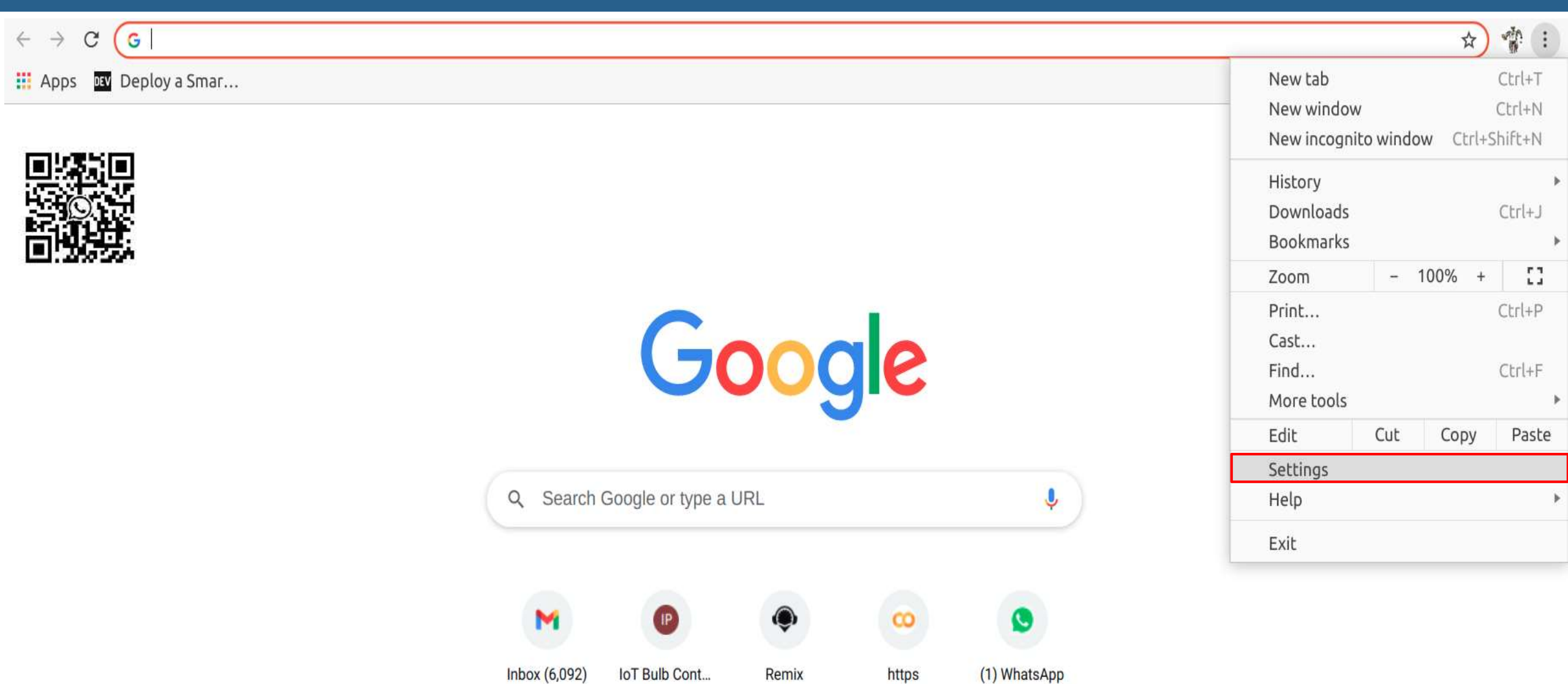
Adding Metamask

Important Steps









- Adding the Metamask extension with Google Chrome
- Search for 'Metamask' in Extensions Page
- Add it to Chrome



METAMASK

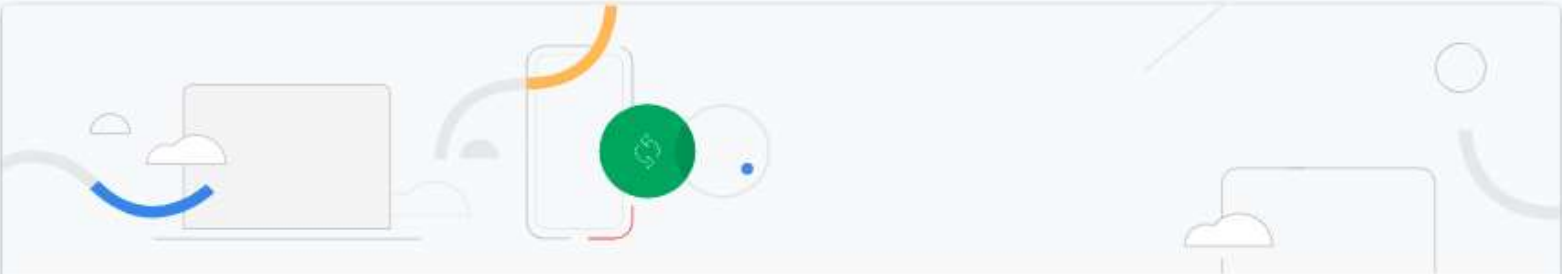


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-  You and Google
-  Auto-fill
-  Safety check
-  Privacy and security
-  Appearance
-  Search engine
-  Default browser
-  On start-up



You and Google



Get Google smarts in Chrome

Sync and personalise Chrome across your devices



Madhu Parvathaneni
parvathanenimadhu@gmail.com

Turn on sync...

- Sync and Google services ▶
- Manage your Google Account ↗
- Chrome name and picture ▶
- Import bookmarks and settings ▶

Advanced ▼

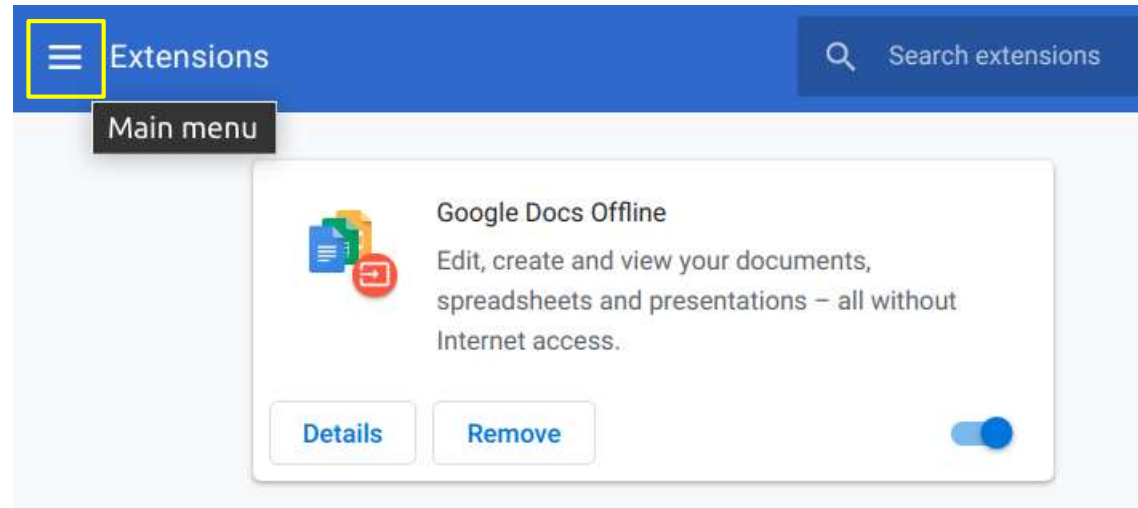
Extensions ↗

Opens in a new tab

About Chrome



Click on the Extensions Menu



To get an access to add a new extension



Extensions

Extensions

Keyboard shortcuts

Click on Open Chrome Web Store

Open Chrome Web Store



For questions, write us on blockchain@madblocks.tech



chrome web store

Search the store



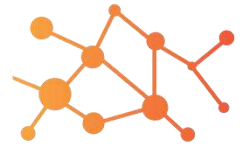
Extensions



Themes

Categories

All



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 chrome web store

x

 Extensions

 Themes

Categories

All

Type metamask and hit **enter**



Extensions



MetaMask

Offered by: <https://metamask.io>

An Ethereum Wallet in your Browser

★★★★★ 1,779 Productivity

Click on this extension called
Metamask



[Home](#) > [Extensions](#) > MetaMask



MetaMask

Offered by: <https://metamask.io>

★★★★★ 1,779

[Productivity](#)

👤 1,000,000+ users

Add to Chrome


Click on **Add to Chrome**

chrome.google.com/webstore/detail/metamask/nkbihfbeogaeaoehlefnkodbefgpgknn?hl=en-GB

Deploy a Smar...

chrome web store

Home > Extensions > MetaMask

 **MetaMask**
Offered by: <https://metamask.io>

★★★★★ 1,779 | Productivity | 1,000,000+ users

It can:

- Read and change all your data on the websites that you visit
- Display notifications
- Modify data that you copy and paste

Cancel Add extension

Checking...

Click on **Add extension**



For questions, write us on blockchain@madblocks.tech



Welcome to MetaMask

Connecting you to Ethereum and the Decentralized Web.
We're happy to see you.

Get Started

Click on **Get Started**



Help Us Improve MetaMask

MetaMask would like to gather usage data to better understand how our users interact with the extension. This data will be used to continually improve the usability and user experience of our product and the Ethereum ecosystem.

MetaMask will..

- ✓ Always allow you to opt-out via Settings
- ✓ Send anonymized click & pageview events
- ✓ Maintain a public aggregate dashboard to educate the community
- ✗ **Never** collect keys, addresses, transactions, balances, hashes, or any personal information
- ✗ **Never** collect your full IP address
- ✗ **Never** sell data for profit. Ever!

No Thanks

I agree

Click on **I agree**



METAMASK

< Back

Create Password

New password (min 8 chars)

Confirm password



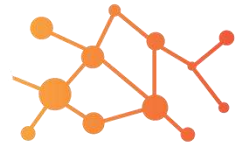
I have read and agree to the [Terms of Use](#)

Create

Enter some valid password
and Click on **Create**



METAMASK



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Secret Backup Phrase

Your secret backup phrase makes it easy to back up and restore your account.

WARNING: Never disclose your backup phrase. Anyone with this phrase can take your Ether forever.



CLICK HERE TO REVEAL SECRET WORDS

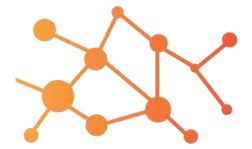
Remind me later

Next

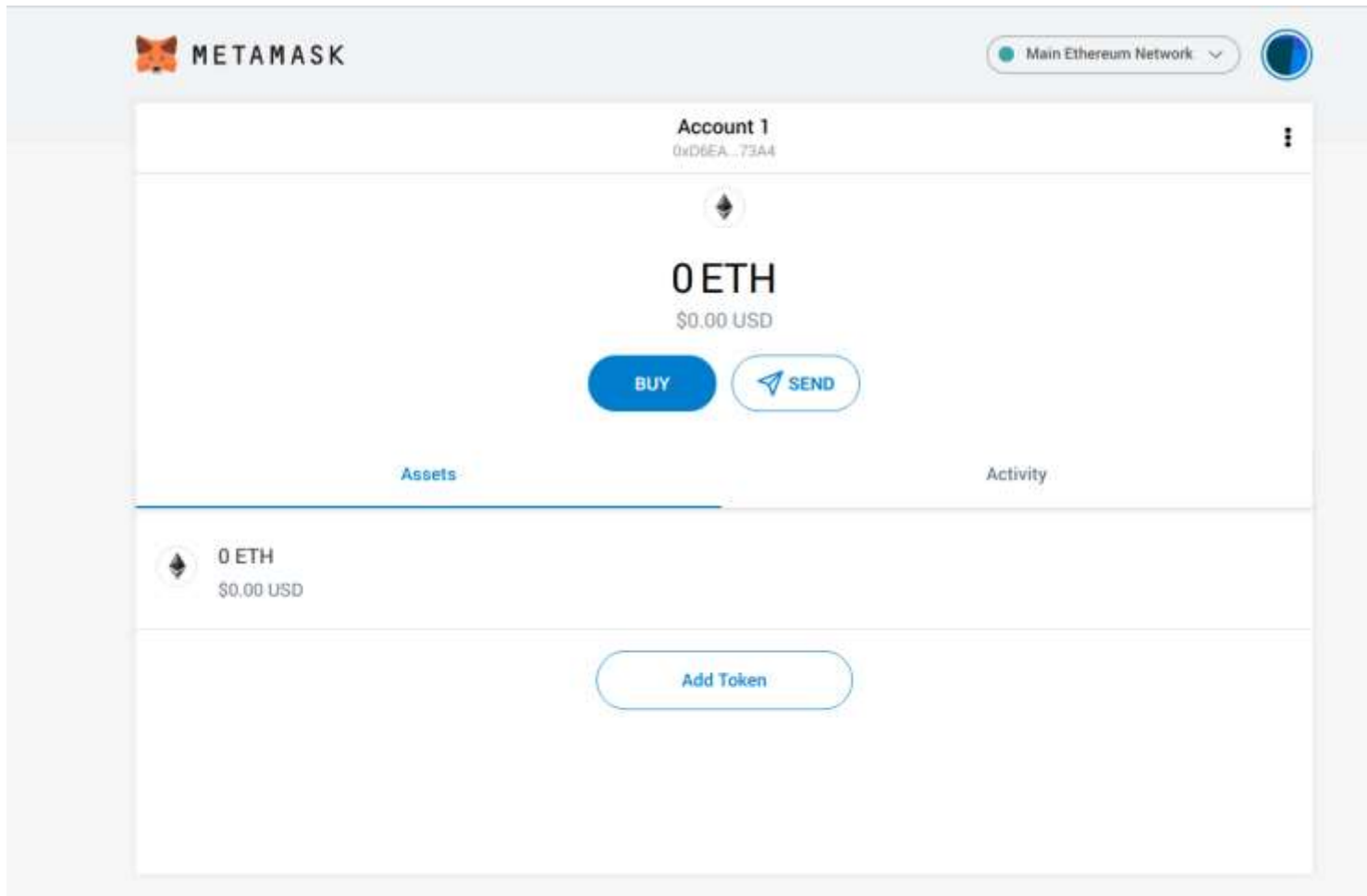
If you want to store backup phrase, you can do it but as of now it is not required.

I'll click on **Remind me later**

For questions, write us on blockchain@madblocks.tech



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**Finally, our Crypto Wallet
is ready for making
transactions.**



For questions, write us on blockchain@madblocks.tech

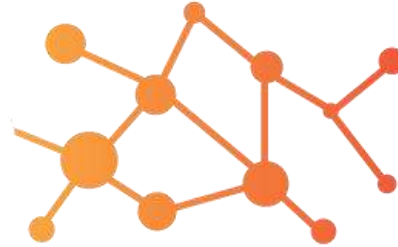


Summary

1. We have added an extension called metamask – A crypto wallet (a gateway to blockchain decentralized apps)
2. We had created a new wallet for making some blockchain transactions which was added as an extension to google chrome.

Metmask – A gateway to blockchain dApps

**THANK
YOU!**



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How to Connect Metamask with Ganache?

For questions, write us on blockchain@madblocks.tech



Launch Ganache Server

Important Steps

- Make sure you have downloaded Ganache Package
- Open and Launch the Ganache Server
- So, that you can connect to Metamask



Ganache

Ganache

ACCOUNTS

BLOCKS

TRANSACTIONS

CONTRACTS

EVENTS

LOGS

UPDATE AVAILABLE

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK0

GAS PRICE20000000000

GAS LIMIT6721975

HARDFORKMUIRGLACIER

NETWORK ID5777

RPC SERVERHTTP://127.0.0.1:7545

MINING STATUSAUTOMINING

WORKSPACE QUICKSTART

SAVE

SWITCH

MNEMONIC

?

goose decline annual river bracket clip bonus change exact canvas ball stay

HD PATH

m/44'/60'/0'/0/account_index

ADDRESS

0x860c7284087b16C78Bd21E17d81326eAA46514d2

BALANCE

100.00 ETH

TX COUNT

0

INDEX

0

ADDRESS

0x1B0261759D53C5822D56bce826Fa654118187619

BALANCE

100.00 ETH

TX COUNT

0

INDEX

1

ADDRESS

0x71f95e6B5Ae050D09DAc0898dE29824051B95470

BALANCE

100.00 ETH

TX COUNT

0

INDEX

2

ADDRESS

0xE3e52268bfe6749fD84320E9102611CCDD42cc55

BALANCE

100.00 ETH

TX COUNT

0

INDEX

3

ADDRESS

0xD0699760e7ff6B197a4701F43cDDC01Fd2B52B34

BALANCE

100.00 ETH

TX COUNT

0

INDEX

4

ADDRESS

0x15a6FaA1053ea166F28D367Df5109dB9E1007428

BALANCE

100.00 ETH

TX COUNT

0

INDEX

5

ADDRESS

0x4be0D575d96ff9224BeE1F8B2F53f1eeaD724F6a

BALANCE

100.00 ETH

TX COUNT

0

INDEX

6

Ganache

ACCOUNTS

BLOCKS

TRANSACTIONS

CONTRACTS

EVENTS

LOGS

UPDATE AVAILABLE

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK0

GAS PRICE20000000000

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NETWORK ID5777

RPC SERVERHTTP://127.0.0.1:7545

MINING STATUSAUTOMINING

WORKSPACE QUICKSTART

SAVE

SWITCH

MNEMONIC ?

HD PATH

goose decline annual river bracket clip bonus change exact canvas ball stay

m/44'/60'/0'/0/account_index

| | | | | |
|--|------------|----------|-------|--|
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x860c7284087b16C78Bd21E17d81326eAA46514d2 | 100.00 ETH | 0 | 0 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x1B0261759D53C5822D56bce826Fa654118187619 | 100.00 ETH | 0 | 1 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x71f95e6B5Ae050D09DAc0898dE29824051B95470 | 100.00 ETH | 0 | 2 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0xE3e52268bfe6749fD84320E9102611CCDD42cc55 | 100.00 ETH | 0 | 3 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0xD0699760e7ff6B197a4701F43cDDC01Fd2B52B34 | 100.00 ETH | 0 | 4 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x15a6FaA1053ea166F28D367Df5109dB9E1007428 | 100.00 ETH | 0 | 5 | |
| ADDRESS | BALANCE | TX COUNT | INDEX | |
| 0x4be0D575d96ff9224BeE1F8B2F53f1eeaD724F6a | 100.00 ETH | 0 | 6 | |



ACCOUNT INFORMATION

ACCOUNT ADDRESS

0x860c7284087b16C78Bd21E17d81326eAA46514d2

PRIVATE KEY

e3865812739df153d967729cf8e642767055bd44855dc8bca086870440de812f

Do not use this private key on a public blockchain; use it for development purposes only!

DONE

Copy the Private Key so that you can import it to the Metamask

For questions, write us on blockchain@madblocks.tech



METAMASK

Main Ethereum Network



Account 1
0xD6EA...73A4



0 ETH

\$0.00 USD

BUY

SEND

Assets



0 ETH

\$0.00 USD

Add Token

My Accounts

Lock

✓  Account 1
0 ETH

+ Create Account

↓ Import Account

🔌 Connect Hardware Wallet

Activity

📘 Info & Help

⚙️ Settings



Create **Import** Hardware

Imported accounts will not be associated with your originally created MetaMask account seedphrase. [Learn more about imported accounts here](#)

Select Type

Private Key



Paste your private key string here:

.....

Cancel

Import



METAMASK

Main Ethereum Network



Account 1

0xD6EA...73A4



0 ETH

\$0.00 USD

BUY



SEND

Assets



0 ETH

\$0.00 USD

Add Token

Networks



The default network for Ether transactions is Main Net.

- ☒ Main Ethereum Network
- ☐ Ropsten Test Network
- ☐ Kovan Test Network
- ☐ Rinkeby Test Network
- ☐ Goerli Test Network
- ☐ Localhost 8545
- ☐ Custom RPC



Settings



General

Advanced

Contacts

Security & Privacy

Alerts

Networks

About

☒ Main Ethereum Network☐ Ropsten Test Network☐ Rinkeby Test Network☐ Goerli Test Network☐ Kovan Test Network☐ Localhost 8545☐ **New Network**

A malicious Ethereum network provider can lie about the state of the blockchain and record your network activity. Only add custom networks you trust.

Network Name

New RPC URL

ChainID (optional)

Symbol (optional)

Block Explorer URL (optional)

Cancel

Save



Settings



General

Advanced

Contacts

Security & Privacy

Alerts

Networks

About

☒ Main Ethereum Network

☐ Ropsten Test Network

☐ Rinkeby Test Network

☐ Goerli Test Network

☐ Kovan Test Network

☐ Localhost 8545

☒ **http://127.0.0.1:7545**

A malicious Ethereum network provider can lie about the state of the blockchain and record your network activity. Only add custom networks you trust.

Network Name

ganache

New RPC URL

http://127.0.0.1:7545

ChainID (optional)

Symbol (optional)

ETH

Block Explorer URL (optional)

Cancel

Save



Account 2

0x860c...14d2



100 ETH

BUY



SEND

Assets

Activity



100 ETH

Add Token



Summary

1. We have connected our metamask with Ganache for transactions on Ganache IP Address and Port number.
2. We had imported an account into metamask with 100 test ethers for doing transactions.

<http://localhost:7545>

**THANK
YOU!**



Session – 3: Smart Contracts



Smart Contract

What is a Smart Contract?

- Smart Contracts are self-executing, business automation applications that run on a decentralized network of a Blockchain.
- Smart Contracts give you:
 - Autonomy (Eradicate the third party)
 - Trust (No one can stole or tamper)
 - Savings (No agents in between parties)
 - Safety (Difficulty to hack)
 - Efficiency (Saving lot of time)





What is Solidity?

What is Solidity?

- Solidity is an object-oriented programming language used to write smart contracts on Ethereum Blockchain.
- Solidity is influenced by C++, Python and JavaScript to target Ethereum Virtual Machine (EVM).
- Solidity Compiler will convert the program into byte code which can be executed by EVM and then deployed on to a Blockchain network.



SOLIDITY



What is Remix IDE?

Remix is a powerful, open source tool that helps you write Solidity contracts straight from the browser. Written in JavaScript, Remix supports both usage in the browser and locally.

Remix also supports testing, debugging and deploying of smart contracts and much more.

Yahoo! We are ready to create our first Smart Contract.





Options in Remix IDE

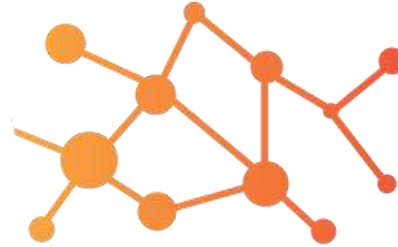
File Explorer – This is an option available on Remix IDE to handle various files associated to a Smart Contract.

Solidity Compiler – This is an option available on Remix IDE to compile the solidity file and push if any errors

Deploy & Run – This is an option available on Remix IDE to deploy and run the smart contract

Let's walk-through at <http://remix.ethereum.org>





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Syntaxes and Data Types

For questions, write us on blockchain@madblocks.tech



pragma

**pragma is a keyword in Solidity programming language
enables certain compilation features**

Syntax:

```
pragma solidity compiler_version;
```

For example:

```
pragma solidity 0.6.6;
```





Comments

Comments are programmer friendly and Solidity supports comments as C/C++ language

1. Single Line Comment

Syntax:

```
// This line is commented
```

2. Multiple Line Comment

Syntax:

```
/*  
These are the multiple lines  
are commented  
*/
```





Data Types

Type of data that involves in Solidity Programming

1. Boolean - bool
2. Unsigned Integer – uint8 to uint256 – uint
3. Signed Integer – int8 to int256 – int
4. Fixed Point Numbers – fixedMxN – M bits, N decimal points
5. Unsigned Fixed Point Numbers – ufixedMxN
6. Address – address - 20 byte value

Fixed Point Numbers / Unsigned Fixed Point Numbers
M should be divisible by 8 (8 to 256)
N should be in range 0 to 80



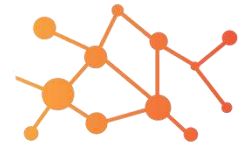


Variables

Variables are identifiers where you can store a value

1. State Variables
 - whose values are permanently stored in contract storage
 1. Local Variables
 - whose values are accessible till function is executing
 3. Global Variables
 - whose values are accessible through the Blockchain
-
- 1. Variable Declaration**
 - 2. Variable Definition**
 - 3. Variable Initialization**
 - 4. Variable Assignment**





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Scope of Variables

Local Variable scope lies within the function whereas the State Variable scopes are of following:

1. public
 - Both internal and external access through function calls
1. internal
 - only internal access within the contract or derived contracts
3. private
 - only internal access within the contract

Syntax:

dataType scope var_name;





Operators

Operator is used to perform operation. There were different types of operators same as C/C++. Let's see what are they:

1. Arithmetic Operators

- +, -, *, /, %, ++, --

1. Comparison Operators

- ==, !=, >, <, >=, <=

3. Logical Operators

- &&, ||, !

4. Bitwise Operators

- &, |, ~, ^, <<, >>

5. Assignment Operators

- =, +=, -=, *=, /=, %=

6. Conditional Operator

- ?:





Loops

A branch of statements gets executed over and over.
The following were the loops available:

1. while Loop
1. do...while Loop
3. for Loop
4. Loop Control
 - break
 - continue





Decision Making

A branch of statements gets executed on a condition check.
The following were available:

1. if statement
1. if.....else statement
3. if.....else if statement





Strings

Solidity supports string literals using either double quote or single quote.

Syntax:

```
string data='text';
```

1. \r – Carriage Return
1. \n – new line
3. \\ - Backslash
4. \t – tab space
5. \x – Hexadecimal Value





Arrays

Collection of values of similar data Type same as arrays in C programming language

Syntax:

```
uint[3] a = [1,2,3];
```

You can access the members of the array through index.

Index value starts with 0

You can also create both static and dynamic arrays





enums

The values in the enumerated list are called enums

Syntax:

```
enum madhu {ORANGE, MANGO, APPLE}
```

```
madhu ms;  
ms=madhu.ORANGE // 0  
ms=madhu.MANGO // 1  
ms=madhu.APPLE // 2
```





structures

Collection of values of different data Type same as structures in C programming language

Syntax:

```
struct abc  
{  
    string a;  
    uint b;  
}
```

You can access the members of the structure through structure variable.
You can use dot operator to access its members





ethers

Lets look at the denomination of ethers

- 1. 1 wei = 1
- 1. 1 sazboo = 1e12
- 3. 1 finney = 1e15
- 4. 1 ether = 1e18





Functions

Group of reusable code which can be called anywhere throughout the program which is same as functions in C/C++

Syntax:

```
function function_name (parameters) scope returns () {  
    _____  
    _____  
    _____  
}
```

function definition has to be created before you make a function call
scope – public/private/view/pure





Function Calls

If you want to execute a branch of reusable code, then you have to make a function call so that the branch will get executed.

Syntax:

```
function function_name (parameters) scope returns () {
```

```
    _____  
    _____  
    _____
```

```
}
```

```
function_name(parameters);
```





Function Modifier

Function Modifiers are the modifiers which modifies the function behaviour and they were widely used in Smart Contracts.

Syntax:

```
modifier modifierName {  
    require (parameters);  
    _;  
}
```

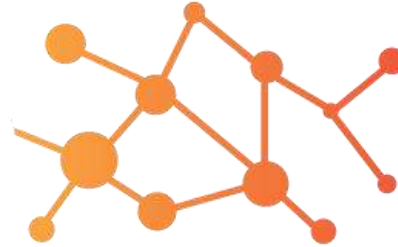




Summary

1. We have understood what are the syntaxes and operations available in Solidity programming language.
2. We had gone through various examples in understanding solidity programming language.

**THANK
YOU!**



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Creating a Smart Contract

For questions, write us on blockchain@madblocks.tech



Lets create your first smart contract

Step – 1: Open your Remix IDE





Lets create your first smart contract

Step – 1: Open your Remix IDE

Step – 2: Delete all the temporary files and create new sol file





Lets create your first smart contract

Step – 1: Open your Remix IDE

Step – 2: Delete all the temporary files and create new sol file

Step – 3: Create a Smart Contract on basic bank balance





Lets create your first smart contract

Step – 1: Open your Remix IDE

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Step – 3: Create a Smart Contract on basic bank balance

Step – 4: Compile your program





Lets create your first smart contract

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Step – 5: Deploy it on JavaScript Virtual Machine





Lets create your first smart contract

Step – 1: Open your Remix IDE

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Step – 5: Deploy it on JavaScript Virtual Machine

Step – 6: Deploy it on Ganache





Lets create your first smart contract

Step – 1: Open your Remix IDE

Step – 2: Delete all the temporary files and create new sol file

Step – 3: Create a Smart Contract on basic bank balance

Step – 4: Compile your program

Step – 5: Deploy it on JavaScript Virtual Machine

Step – 6: Deploy it on Ganache



Hey, Smart Contract is Up !!!!



Demonstrations

Election Voting Dapp:

This Decentralized application focuses on election voting where only one vote has to be casted from one account and instant result can be easily produced. All the data gets stored in the blockchain network.

Registration Dapp:

This Decentralized application focuses on basic registration data which is generally required for any decentralized app. All the data gets stored in the blockchain network.

You can clone from <https://github.com/madblocksgit>





Summary

1. We have understood how to create and deploy a smart contract and also we have created a basic contract.
2. Decentralized applications which gets connected to blockchain server and works like a centralized where there will be a blockchain instead of a normal database.

**THANK
YOU!**