

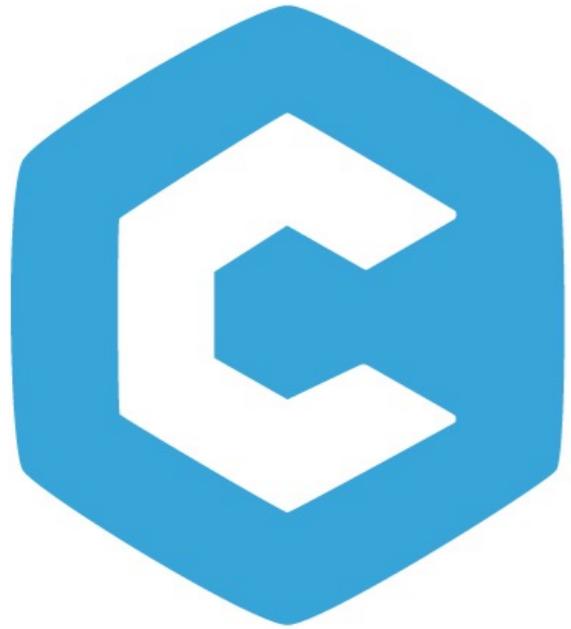
ETHEREUM & REACT

An introduction to building
your first web dApp



RYAN HAGERTY

Front-End Developer



CHROMATIC

chromatichq.com

A close-up photograph of a pepperoni pizza. The pizza is covered in melted cheese and numerous slices of pepperoni. The crust appears to be a thin-crust style. The toppings are evenly distributed across the surface of the pizza.

@HOTPIZZAS

GOAL

A dark, low-light photograph of a person from the side and back, sitting at a desk and looking down at a keyboard. The person is wearing a brown t-shirt. The background is dark and indistinct.

MHK

(minimal hacking knowledge)

1



IDEA

1

2



IDEA

TOOLS

1

2

3



IDEA

TOOLS

PROJECT

WHAT WE'LL LEARN

Blockchain

Ethereum & Smart Contracts

Tools & Frameworks You Need

Basics of Solidity

Sample Hello World Project

React Components with Ethereum/web3

Testing

BLOCKCHAIN

(crash course)



(HOLD ON TO YOUR BUTTS)

A photograph of a field filled with dandelions. The plants are tall with many small, round, white seed heads. The image is heavily desaturated, giving it a dark, almost black-and-white appearance. The text is overlaid on this dark background.

WHAT WE WON'T COVER

WHAT WE WON'T COVER

Cryptography

WHAT WE WON'T COVER

Cryptography

Proof of Work vs. Proof of Stake

WHAT WE WON'T COVER

Cryptography

Proof of Work vs. Proof of Stake

Byzantine Generals' Problem

WHAT WE WON'T COVER

Cryptography

Proof of Work vs. Proof of Stake

Byzantine Generals' Problem

Etc.

1

THE IDEA

THE INTERNET

(as it is)

or

THE INTERNET OF INFORMATION

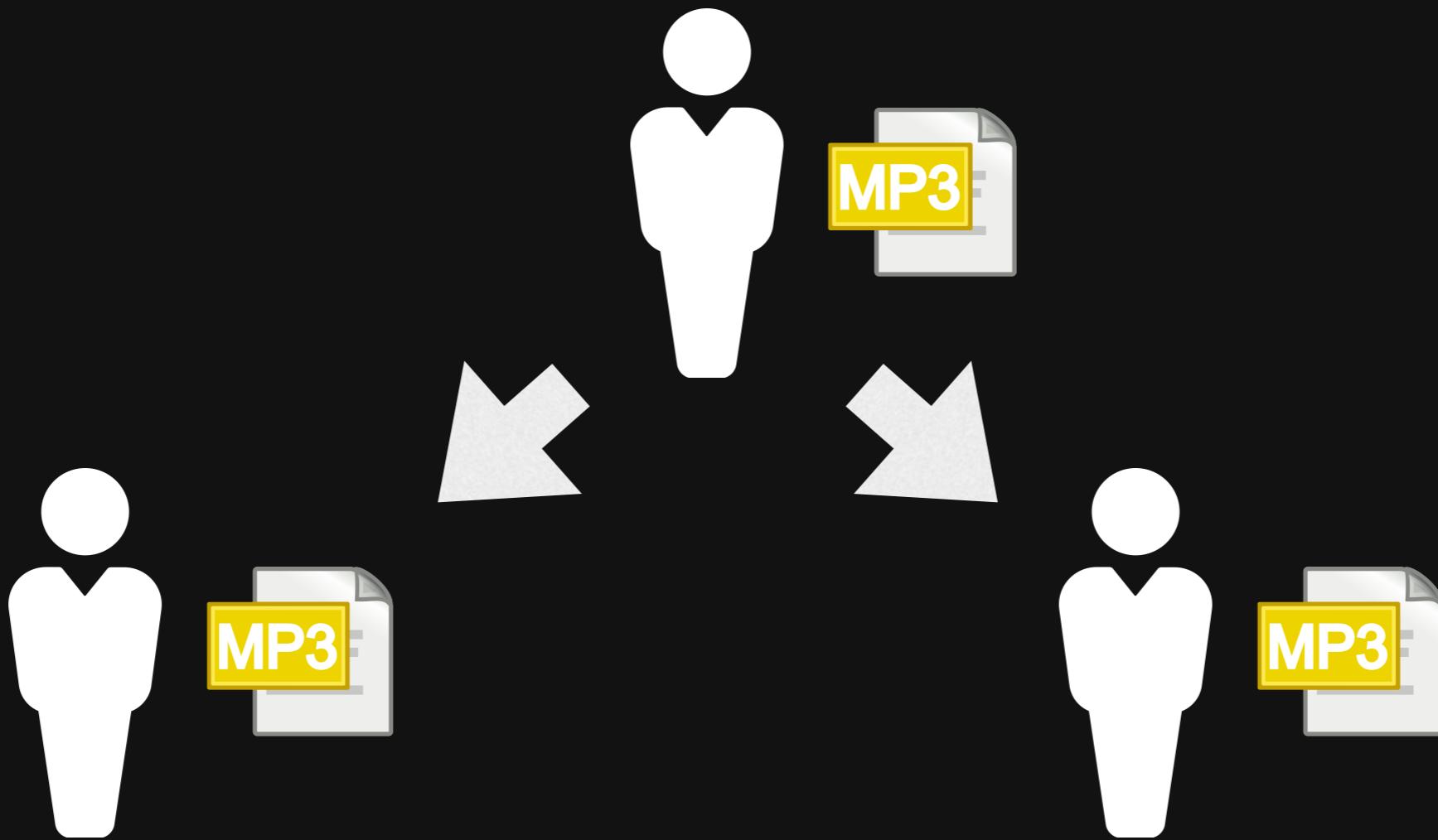
TRANSMIT INFORMATION

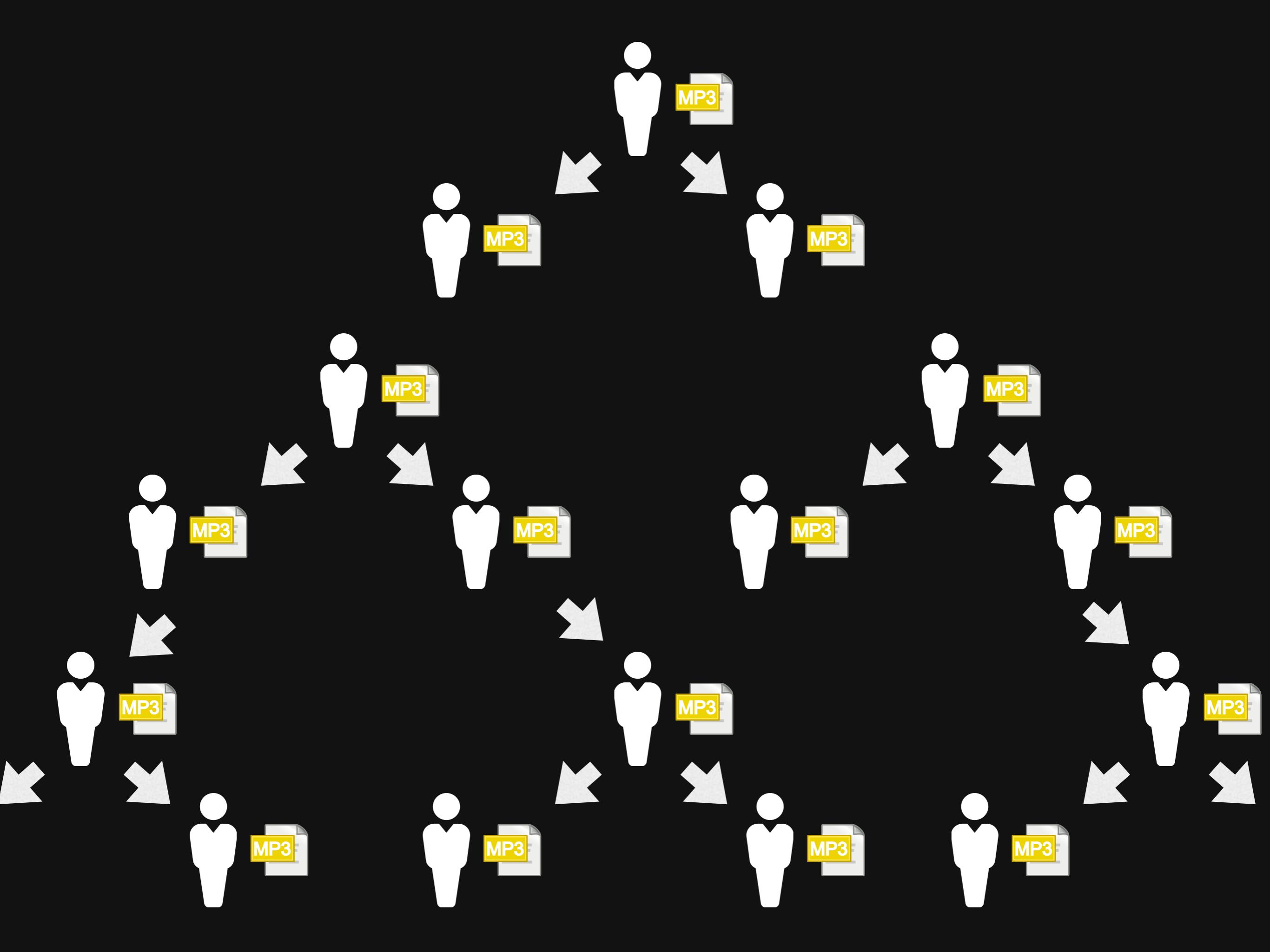


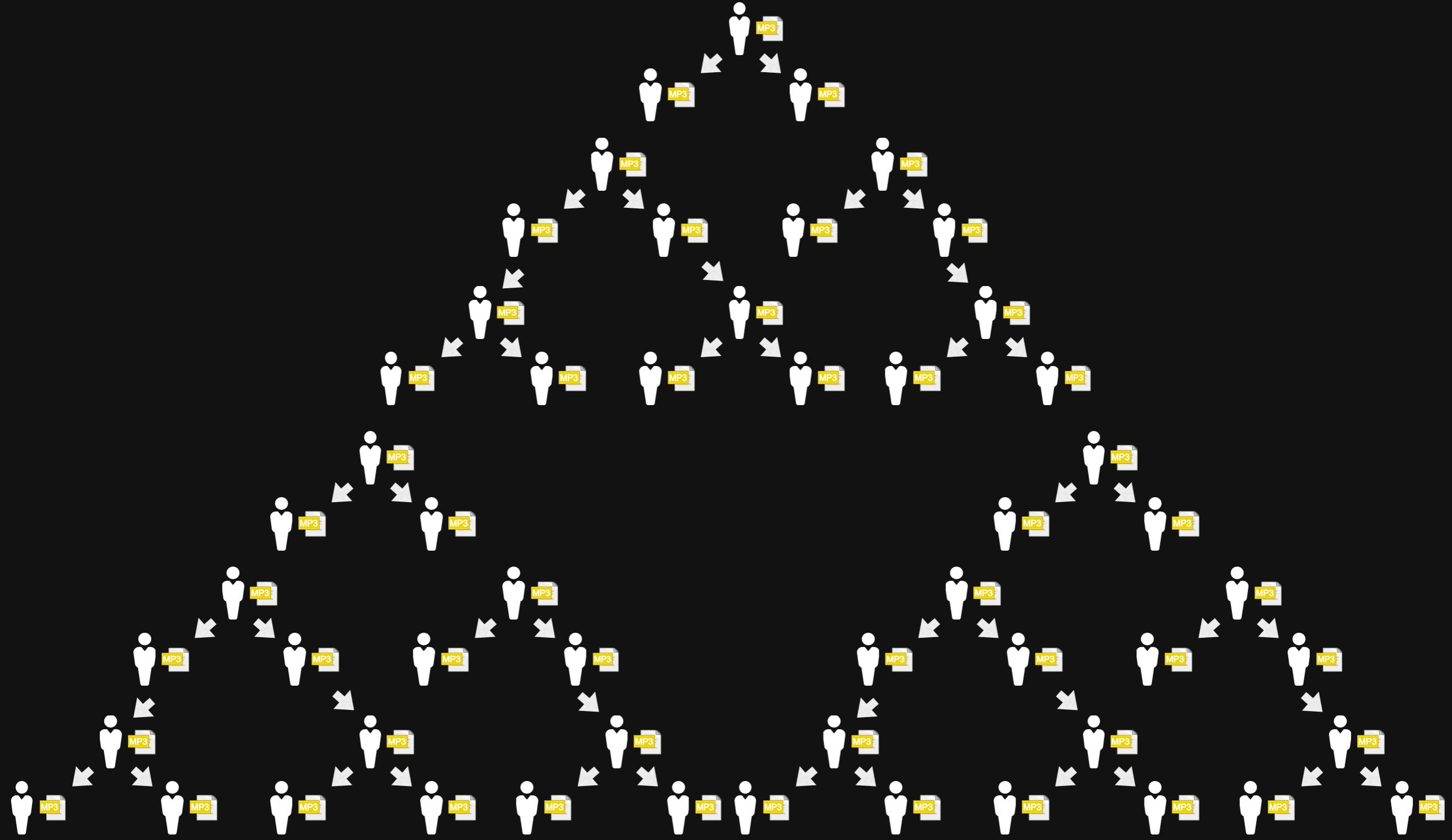
TRANSMIT INFORMATION



TRANSMIT INFORMATION







THE INTERNET

(as it could be)

or

THE INTERNET OF VALUE

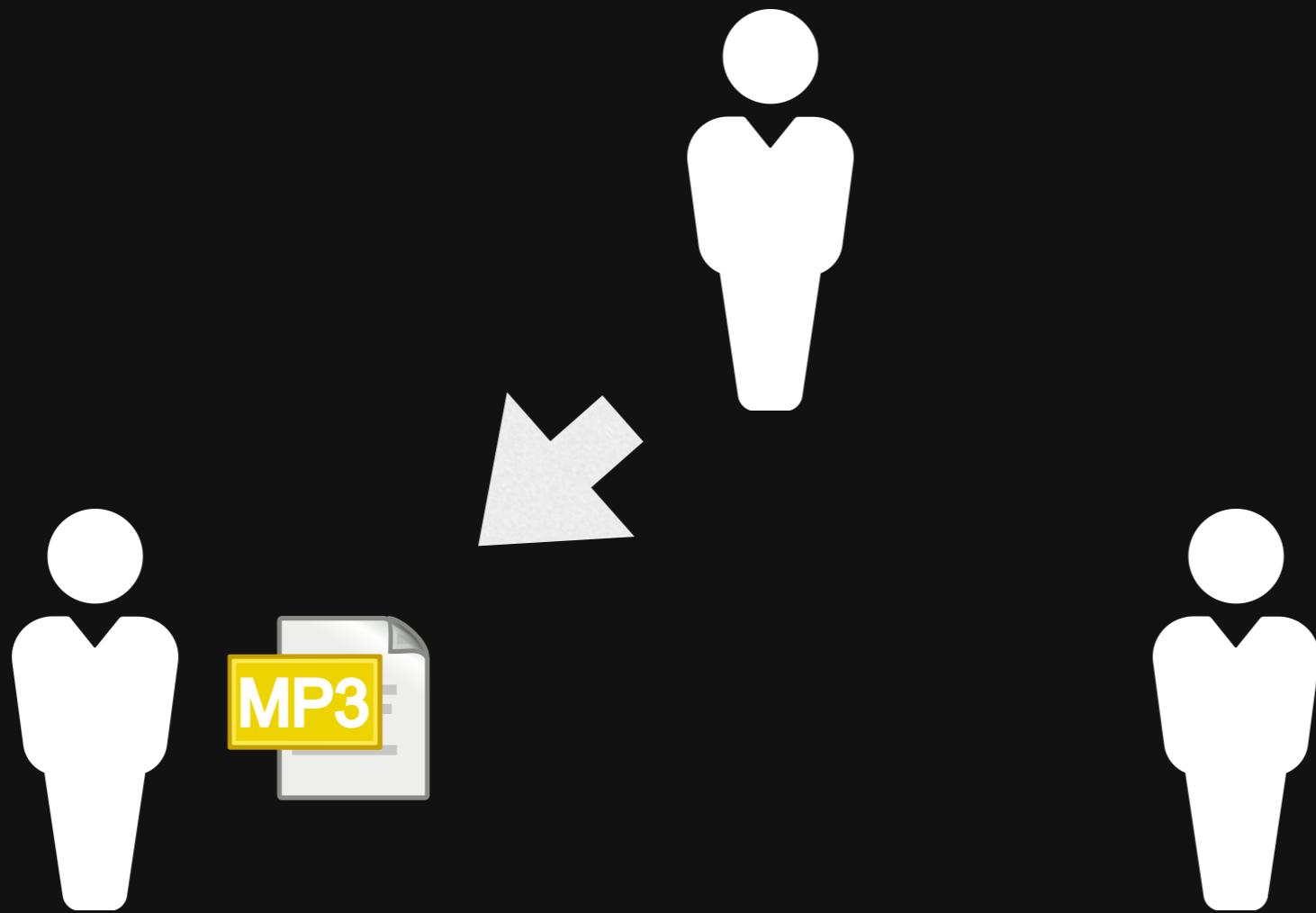
BLOCKCHAIN

(how to transmit value)

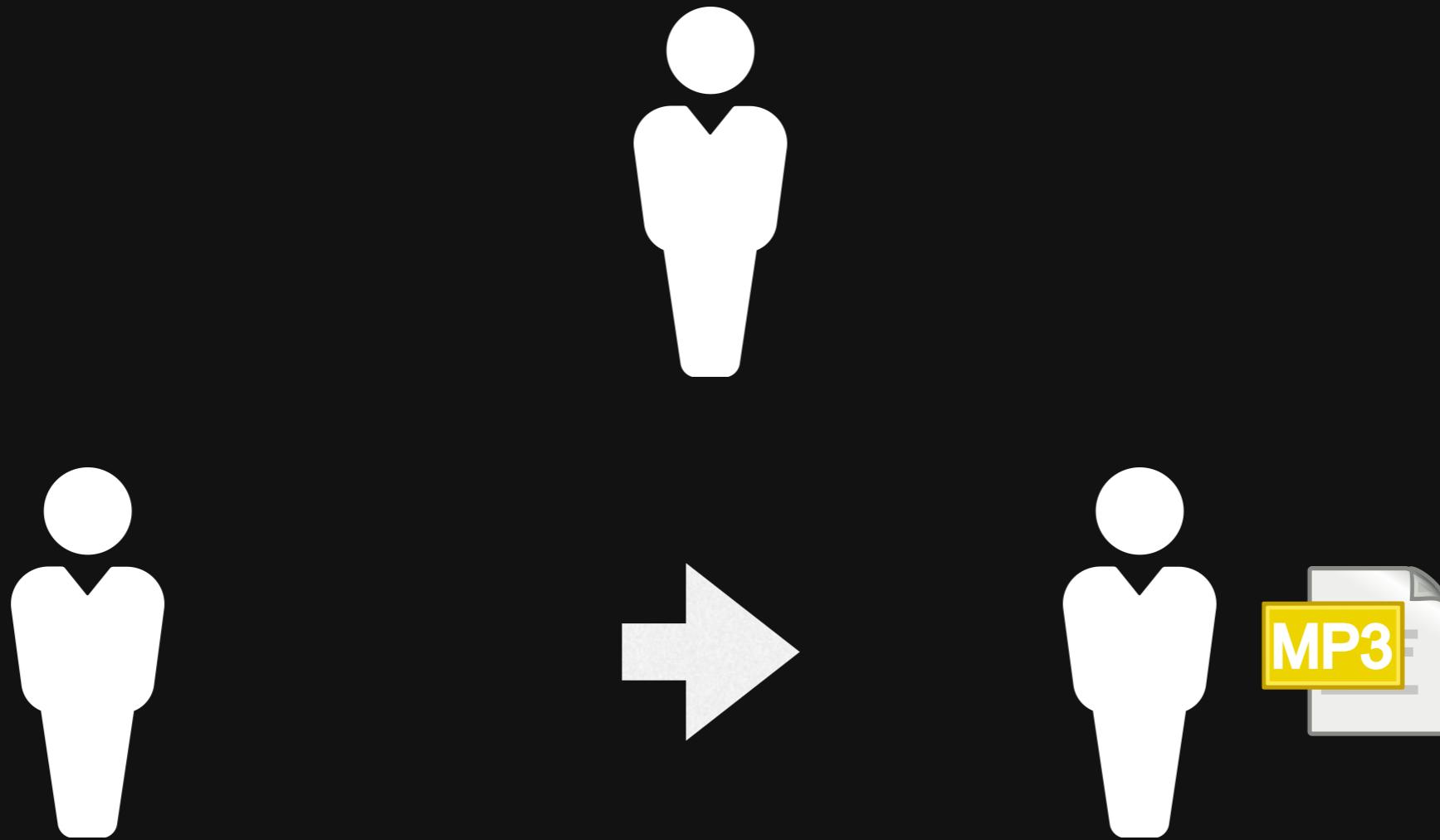
TRANSMIT VALUE



TRANSMIT VALUE



TRANSMIT VALUE





MONEY

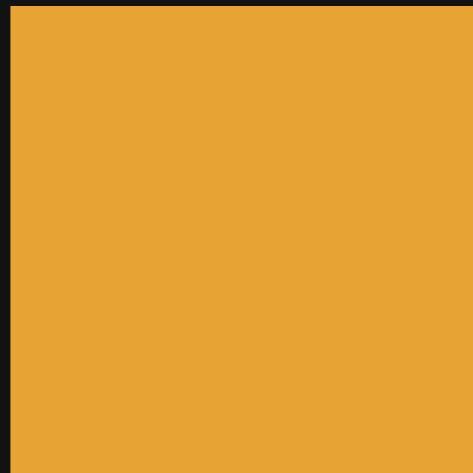
A large brown dog with a shaggy coat is sitting on a dark-colored couch. The dog is facing towards the right side of the frame. In the background, there's a window with a view of a building across the street. The overall atmosphere is casual and domestic.

BUT HOW?

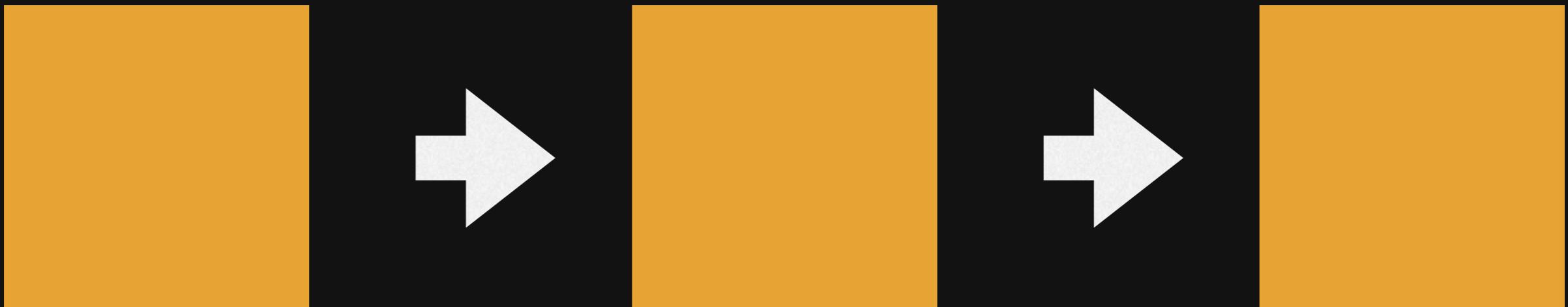
THE LEDGER



BLOCKCHAIN



BLOCKCHAIN



each block represents a piece of history



**AWESOME
BENEFITS**



DECENTRALIZED



IMMUTABLE



PERMISSIONLESS

BASIC OPERATION

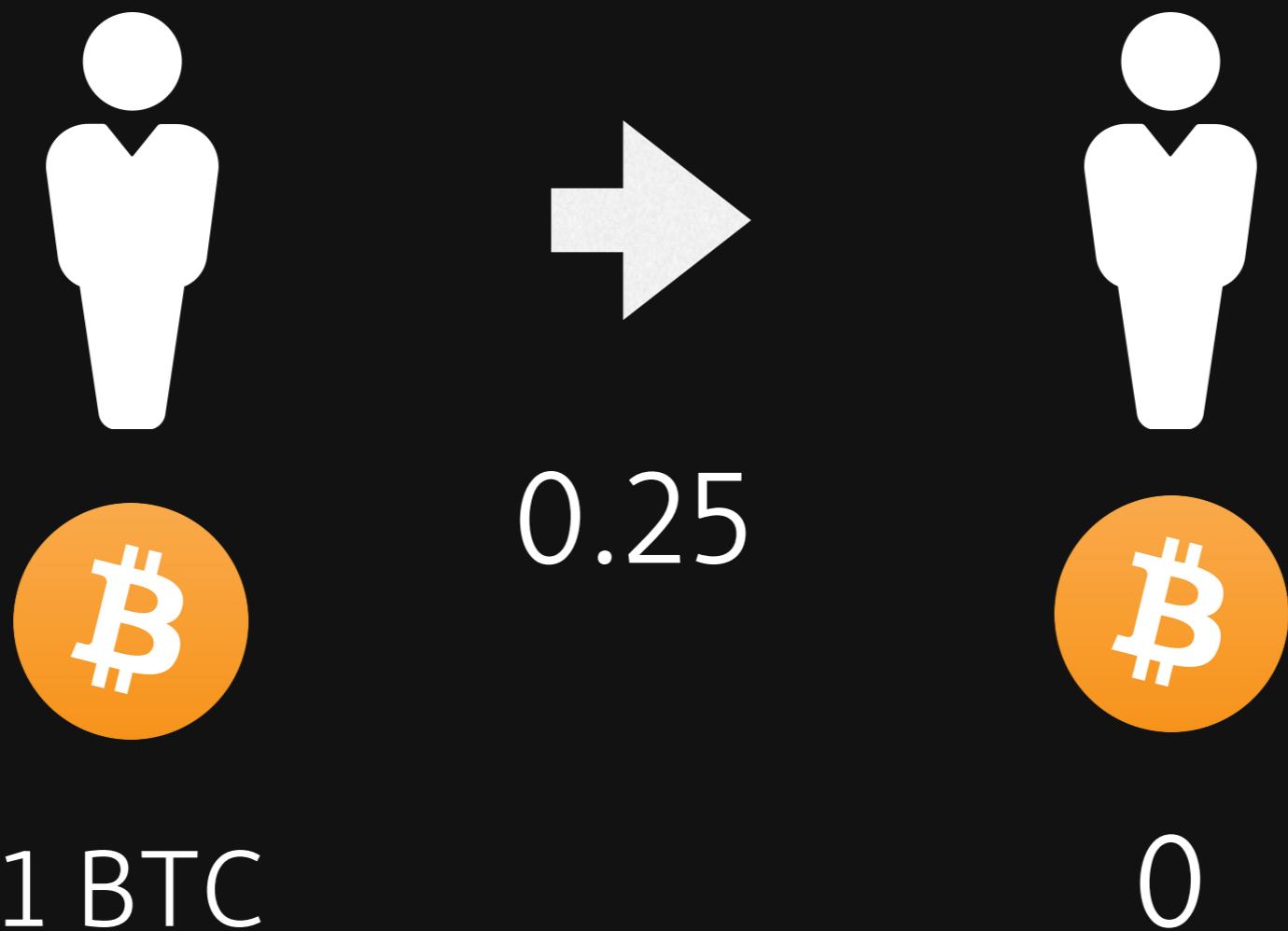


1 BTC

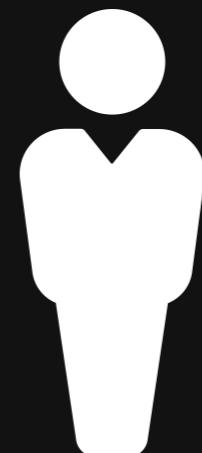
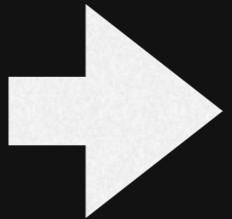


0

BASIC OPERATION



BASIC OPERATION



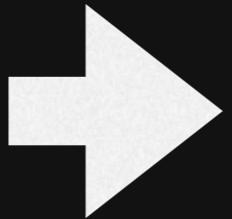
1 - 0.25

0.75 BTC



0

BASIC OPERATION



1 - 0.25

0.75 BTC



0 + 0.25

0.25 BTC

STILL BASIC LEDGER

**BEYOND MONEY
&
RECORD ALL
VALUE**



ETHERIUM

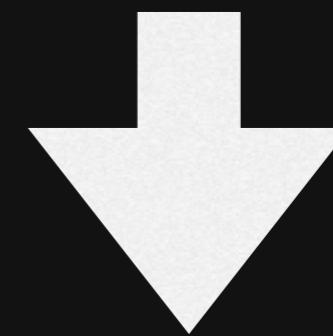
A photograph of an open ledger book. The pages are yellowed and show handwritten entries in blue ink. The left page contains several names and numbers, while the right page has a large table with columns for dates, descriptions, and monetary amounts.

Date	Description	Debit	Credit
1/10/00	John Doe	100.00	
1/15/00	Jane Smith	50.00	
1/20/00	Bob Johnson	75.00	
1/25/00	Mary Williams	25.00	
1/30/00	David Lee	100.00	
2/1/00	Sarah Green	50.00	
2/6/00	Tom White	75.00	
2/11/00	Emily Black	25.00	
2/16/00	Frank Wilson	100.00	
2/21/00	Susan Lee	50.00	
2/26/00	David Green	75.00	
3/1/00	Emily Black	25.00	
3/6/00	Frank Wilson	100.00	
3/11/00	Susan Lee	50.00	
3/16/00	David Green	75.00	
3/21/00	Emily Black	25.00	
3/26/00	Frank Wilson	100.00	
4/1/00	Susan Lee	50.00	
4/6/00	David Green	75.00	
4/11/00	Emily Black	25.00	
4/16/00	Frank Wilson	100.00	
4/21/00	Susan Lee	50.00	
4/26/00	David Green	75.00	
5/1/00	Emily Black	25.00	
5/6/00	Frank Wilson	100.00	
5/11/00	Susan Lee	50.00	
5/16/00	David Green	75.00	
5/21/00	Emily Black	25.00	
5/26/00	Frank Wilson	100.00	
6/1/00	Susan Lee	50.00	
6/6/00	David Green	75.00	
6/11/00	Emily Black	25.00	
6/16/00	Frank Wilson	100.00	
6/21/00	Susan Lee	50.00	
6/26/00	David Green	75.00	
7/1/00	Emily Black	25.00	
7/6/00	Frank Wilson	100.00	
7/11/00	Susan Lee	50.00	
7/16/00	David Green	75.00	
7/21/00	Emily Black	25.00	
7/26/00	Frank Wilson	100.00	
8/1/00	Susan Lee	50.00	
8/6/00	David Green	75.00	
8/11/00	Emily Black	25.00	
8/16/00	Frank Wilson	100.00	
8/21/00	Susan Lee	50.00	
8/26/00	David Green	75.00	
9/1/00	Emily Black	25.00	
9/6/00	Frank Wilson	100.00	
9/11/00	Susan Lee	50.00	
9/16/00	David Green	75.00	
9/21/00	Emily Black	25.00	
9/26/00	Frank Wilson	100.00	
10/1/00	Susan Lee	50.00	
10/6/00	David Green	75.00	
10/11/00	Emily Black	25.00	
10/16/00	Frank Wilson	100.00	
10/21/00	Susan Lee	50.00	
10/26/00	David Green	75.00	
11/1/00	Emily Black	25.00	
11/6/00	Frank Wilson	100.00	
11/11/00	Susan Lee	50.00	
11/16/00	David Green	75.00	
11/21/00	Emily Black	25.00	
11/26/00	Frank Wilson	100.00	
12/1/00	Susan Lee	50.00	
12/6/00	David Green	75.00	
12/11/00	Emily Black	25.00	
12/16/00	Frank Wilson	100.00	
12/21/00	Susan Lee	50.00	
12/26/00	David Green	75.00	
1/1/01	Emily Black	25.00	
1/6/01	Frank Wilson	100.00	
1/11/01	Susan Lee	50.00	
1/16/01	David Green	75.00	
1/21/01	Emily Black	25.00	
1/26/01	Frank Wilson	100.00	
2/1/01	Susan Lee	50.00	
2/6/01	David Green	75.00	
2/11/01	Emily Black	25.00	
2/16/01	Frank Wilson	100.00	
2/21/01	Susan Lee	50.00	
2/26/01	David Green	75.00	
3/1/01	Emily Black	25.00	
3/6/01	Frank Wilson	100.00	
3/11/01	Susan Lee	50.00	
3/16/01	David Green	75.00	
3/21/01	Emily Black	25.00	
3/26/01	Frank Wilson	100.00	
4/1/01	Susan Lee	50.00	
4/6/01	David Green	75.00	
4/11/01	Emily Black	25.00	
4/16/01	Frank Wilson	100.00	
4/21/01	Susan Lee	50.00	
4/26/01	David Green	75.00	
5/1/01	Emily Black	25.00	
5/6/01	Frank Wilson	100.00	
5/11/01	Susan Lee	50.00	
5/16/01	David Green	75.00	
5/21/01	Emily Black	25.00	
5/26/01	Frank Wilson	100.00	
6/1/01	Susan Lee	50.00	
6/6/01	David Green	75.00	
6/11/01	Emily Black	25.00	
6/16/01	Frank Wilson	100.00	
6/21/01	Susan Lee	50.00	
6/26/01	David Green	75.00	
7/1/01	Emily Black	25.00	
7/6/01	Frank Wilson	100.00	
7/11/01	Susan Lee	50.00	
7/16/01	David Green	75.00	
7/21/01	Emily Black	25.00	
7/26/01	Frank Wilson	100.00	
8/1/01	Susan Lee	50.00	
8/6/01	David Green	75.00	
8/11/01	Emily Black	25.00	
8/16/01	Frank Wilson	100.00	
8/21/01	Susan Lee	50.00	
8/26/01	David Green	75.00	
9/1/01	Emily Black	25.00	
9/6/01	Frank Wilson	100.00	
9/11/01	Susan Lee	50.00	
9/16/01	David Green	75.00	
9/21/01	Emily Black	25.00	
9/26/01	Frank Wilson	100.00	
10/1/01	Susan Lee	50.00	
10/6/01	David Green	75.00	
10/11/01	Emily Black	25.00	
10/16/01	Frank Wilson	100.00	
10/21/01	Susan Lee	50.00	
10/26/01	David Green	75.00	
11/1/01	Emily Black	25.00	
11/6/01	Frank Wilson	100.00	
11/11/01	Susan Lee	50.00	
11/16/01	David Green	75.00	
11/21/01	Emily Black	25.00	
11/26/01	Frank Wilson	100.00	
12/1/01	Susan Lee	50.00	
12/6/01	David Green	75.00	
12/11/01	Emily Black	25.00	
12/16/01	Frank Wilson	100.00	
12/21/01	Susan Lee	50.00	
12/26/01	David Green	75.00	
1/1/02	Emily Black	25.00	
1/6/02	Frank Wilson	100.00	
1/11/02	Susan Lee	50.00	
1/16/02	David Green	75.00	
1/21/02	Emily Black	25.00	
1/26/02	Frank Wilson	100.00	
2/1/02	Susan Lee	50.00	
2/6/02	David Green	75.00	
2/11/02	Emily Black	25.00	
2/16/02	Frank Wilson	100.00	
2/21/02	Susan Lee	50.00	
2/26/02	David Green	75.00	
3/1/02	Emily Black	25.00	
3/6/02	Frank Wilson	100.00	
3/11/02	Susan Lee	50.00	
3/16/02	David Green	75.00	
3/21/02	Emily Black	25.00	
3/26/02	Frank Wilson	100.00	
4/1/02	Susan Lee	50.00	
4/6/02	David Green	75.00	
4/11/02	Emily Black	25.00	
4/16/02	Frank Wilson	100.00	
4/21/02	Susan Lee	50.00	
4/26/02	David Green	75.00	
5/1/02	Emily Black	25.00	
5/6/02	Frank Wilson	100.00	
5/11/02	Susan Lee	50.00	
5/16/02	David Green	75.00	
5/21/02	Emily Black	25.00	
5/26/02	Frank Wilson	100.00	
6/1/02	Susan Lee	50.00	
6/6/02	David Green	75.00	
6/11/02	Emily Black	25.00	
6/16/02	Frank Wilson	100.00	
6/21/02	Susan Lee	50.00	
6/26/02	David Green	75.00	
7/1/02	Emily Black	25.00	
7/6/02	Frank Wilson	100.00	
7/11/02	Susan Lee	50.00	
7/16/02	David Green	75.00	
7/21/02	Emily Black	25.00	
7/26/02	Frank Wilson	100.00	
8/1/02	Susan Lee	50.00	
8/6/02	David Green	75.00	
8/11/02	Emily Black	25.00	
8/16/02	Frank Wilson	100.00	
8/21/02	Susan Lee	50.00	
8/26/02	David Green	75.00	
9/1/02	Emily Black	25.00	
9/6/02	Frank Wilson	100.00	
9/11/02	Susan Lee	50.00	
9/16/02	David Green	75.00	
9/21/02	Emily Black	25.00	
9/26/02	Frank Wilson	100.00	
10/1/02	Susan Lee	50.00	
10/6/02	David Green	75.00	
10/11/02	Emily Black	25.00	
10/16/02	Frank Wilson	100.00	
10/21/02	Susan Lee	50.00	
10/26/02	David Green	75.00	
11/1/02	Emily Black	25.00	
11/6/02	Frank Wilson	100.00	
11/11/02	Susan Lee	50.00	
11/16/02	David Green	75.00	
11/21/02	Emily Black	25.00	
11/26/02	Frank Wilson	100.00	
12/1/02	Susan Lee	50.00	
12/6/02	David Green	75.00	
12/11/02	Emily Black	25.00	
12/16/02	Frank Wilson	100.00	
12/21/02	Susan Lee	50.00	
12/26/02	David Green	75.00	
1/1/03	Emily Black	25.00	
1/6/03	Frank Wilson	100.00	
1/11/03	Susan Lee	50.00	
1/16/03	David Green	75.00	
1/21/03	Emily Black	25.00	
1/26/03	Frank Wilson	100.00	
2/1/03	Susan Lee	50.00	</

```
        'replace_interests' => false,  
        'send_welcome'      => false,  
    );  
  
    if($error, $result)) {  
        $result = array ('response'=>'error', 'message'  
    }  
    else {  
        $result = array ('response'=>'success');  
  
    }  
    echo json_encode($result);
```

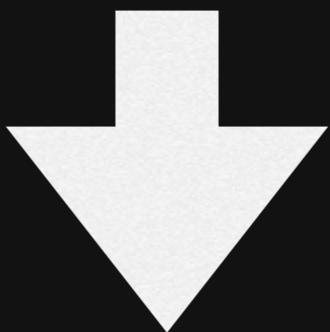


PROGRAMMING LANGUAGE



LEDGER

DISTRIBUTED
LEDGER



DISTRIBUTED
COMPUTER

A dark, moody photograph of a person from the side and slightly behind. The person is wearing a dark hoodie and a VR headset, looking down at a keyboard. The background is blurred, suggesting a dimly lit environment.

ETHEREUM VIRTUAL MACHINE

TRANSMIT VALUE OF

TRANSMIT VALUE OF

Copyrighted Material

TRANSMIT VALUE OF

Copyrighted Material

Real Estate

TRANSMIT VALUE OF

Copyrighted Material

Real Estate

Insurance

TRANSMIT VALUE OF

Copyrighted Material

Real Estate

Insurance

Legal Contracts

TRANSMIT VALUE OF

Copyrighted Material

Real Estate

Insurance

Legal Contracts

Supply Chains

TRANSMIT VALUE OF

Copyrighted Material

Real Estate

Insurance

Legal Contracts

Supply Chains

Identity

TRANSMIT VALUE OF

Copyrighted Material

Real Estate

Insurance

Legal Contracts

Supply Chains

Identity

AND MORE!



A dark, slightly blurred background image of a person with long hair sitting at a desk, looking down at a laptop screen. The person is wearing a light-colored hoodie. The overall mood is focused and professional.

ETHEREUM SMART CONTRACTS AND YOU

ETHEREUM VS. ETHER

ETHEREUM

ETHER

ETHEREUM



ETHEREUM VIRTUAL MACHINE

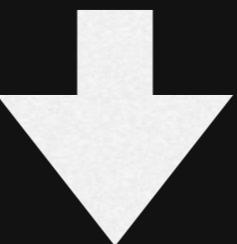
ETHER

ETHEREUM



ETHEREUM VIRTUAL MACHINE

ETHER



CURRENCY*



EVM

(ETHEREUM VIRTUAL MACHINE)

“The EVM, or Ethereum Virtual Machine, is a sandboxed virtual stack machine embedded within each full Ethereum node, responsible for executing contract bytecode.”

— Moe Aboulkheir
September 12, 2017



ETHER

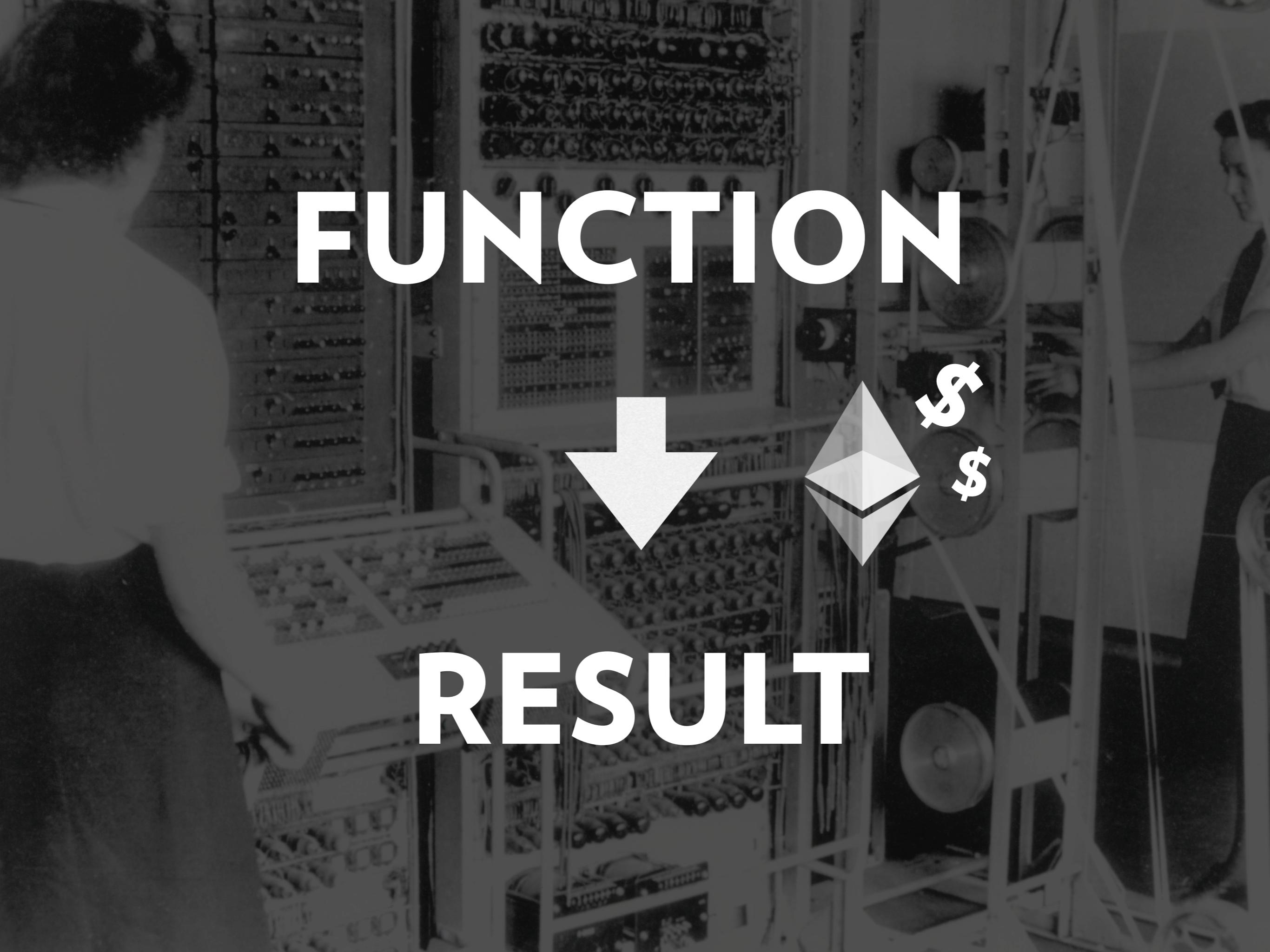
UTILITY CURRENCY



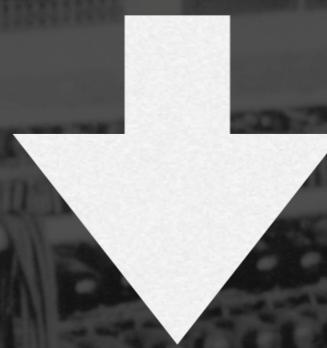
GAS

	Age	From	To	Value	[TxFee]
130	15 secs ago	0xc2f9f063ced69d1...	0x5809b2aff185335...	0.0013 Ether	0.000021
130	15 secs ago	0x345fde54632516...	0x11fb6aef2b0e35e...	0.0004 Ether	0.000021
130	15 secs ago	0xcfef6af4dd3f2d68f...	0xd9a72fec8683db...	0 Ether	0.00008431
130	15 secs ago	0xad79b730a5d0e4...	CryptoKittiesSalesA...	0.5 Ether	0.00006285
130	15 secs ago	0xb014d8b572dc7f...	TerraminerToken	0 Ether	0.00007298
130	15 secs ago	0xc495fb0c...	0x3e0b9ea9d...	0 Ether	0.00007448
130	15 secs ago	0x185775...	First...	0 Ether	0.00009117
130	15 secs ago	0x0027a9e6afdc419...	0x47a8a30a59eea5...	0 Ether	0.00009035
130	15 secs ago	0xd3aa7ee8691700...	0xb5074e52dbd...	0.00011 Ether	0.000042
130	15 secs ago	0xf7b449b69fdcb2e...	0x7050a92118...	0.000379947442413 Ether	0.000042
130	15 secs ago	0xccbd83e519bd20...	0x4202f381b817e4...	0.0001 Ether	0.000042
130	15 secs ago	0x874aad201cae89...	0x955616617695be...	0.3522 Ether	0.000042
130	15 secs ago	0x4886404ecfb86b...	CryptoKittiesCore	0.008 Ether	0.00015997
130	15 secs ago	0xf07a621a4022b14...	BeautyChainToken	0 Ether	0.00004468
130	15 secs ago	0xce0357615ebe...	0xd6c3dc9e3a2215...	0 Ether	0.00012458
130	15 secs ago	0x554bd839f375de...	0x45555629aabfea1...	0 Ether	0.00007436
130	15 secs ago	0xd64c6d86b93ecc...	INDEX_1	0 Ether	0.00019853

TRANSACTION FEE\$



FUNCTION



RESULT

Std Cost for Transfer

\$0.046

Gas Price Std (Gwei)

3

SafeLow Cost for Transfer

\$0.031

Gas Price SafeLow (Gwei)

2

Median Wait (s)

30

Median Wait (blocks)

2

Gas-Time-Price Estimator: For transactions sent at block: 5231215

Adjust confirmation time

Avg Time (min) 3.82

Gas Used* 21000

95% Time (min) 9.55

Avg Time (blocks) 15.36

Gas Price (Gwei)* 3

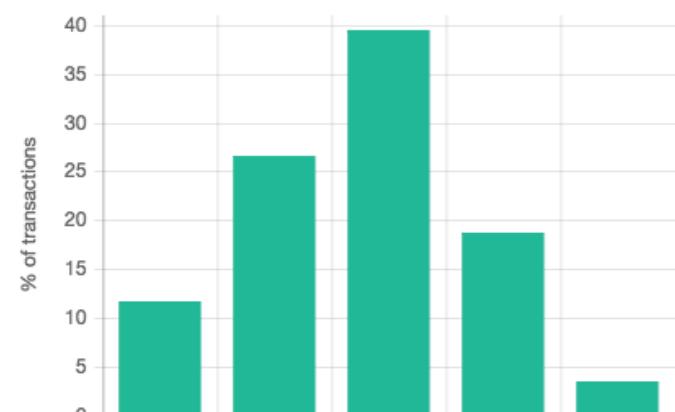
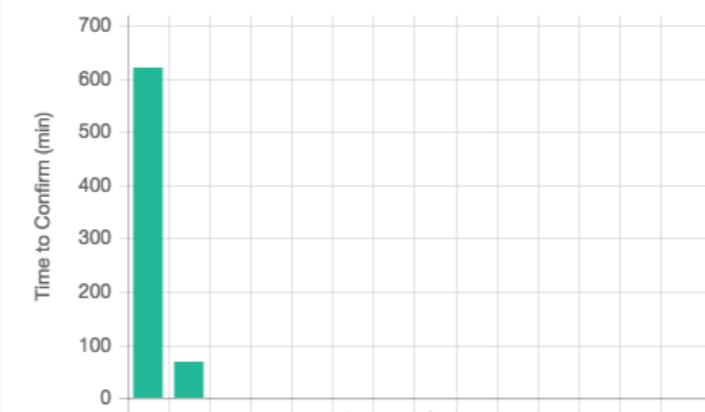
95% Time (blocks) 38.4

Tx Fee (Fiat) \$0.046

Tx Fee (ETH) 0.00006

Real Time Gas Use: % Block Limit (last 10)

Last Block: 5231215

Transaction Count by Gas Price**Confirmation Time by Gas Price****Recommended Gas Prices**

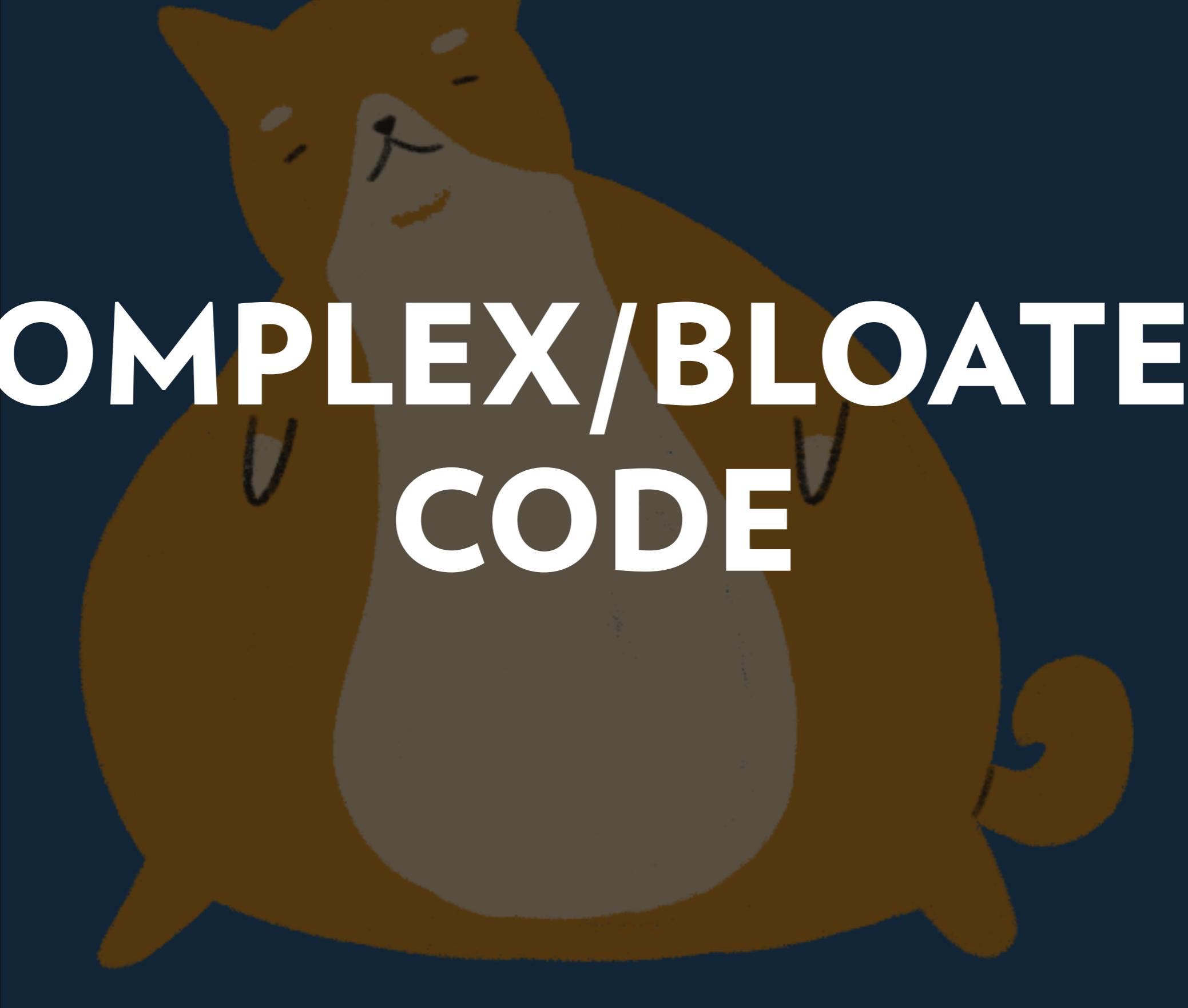
(based on current network conditions)

Speed	Gas Price (gwei)
SafeLow (<30m)	2
Standard (<5m)	3
Fast (<2m)	20

Note: Estimates not valid when multiple transactions are batched from the same address or for transactions sent to addresses with many (e.g. > 100) pending

Top 10 Miners by Blocks Mined: Support for user transactions**Misc Stats** (Last 1,500 blocks)

<https://ethgasstation.info/>

A fluffy, light-colored dog, possibly a Shiba Inu or similar breed, is sitting upright on a dark blue background. The dog has a white chest and paws, and its ears are perked up. It is looking slightly to the left. The overall aesthetic is soft and approachable.

COMPLEX/BLOATED CODE



1MB



\$295 → \$5000

OVER 100 STEPS

— <https://hackernoon.com/ether-purchase-power-df40a38c5a2f>

BYTECODE



TOKENS

ERC20

ERC20

Standard for how to interact with a
smart contract

ERC20

Standard for how to interact with a
smart contract

Its own entity stored on top of
Ethereum blockchain

ERC20

Standard for how to interact with a
smart contract

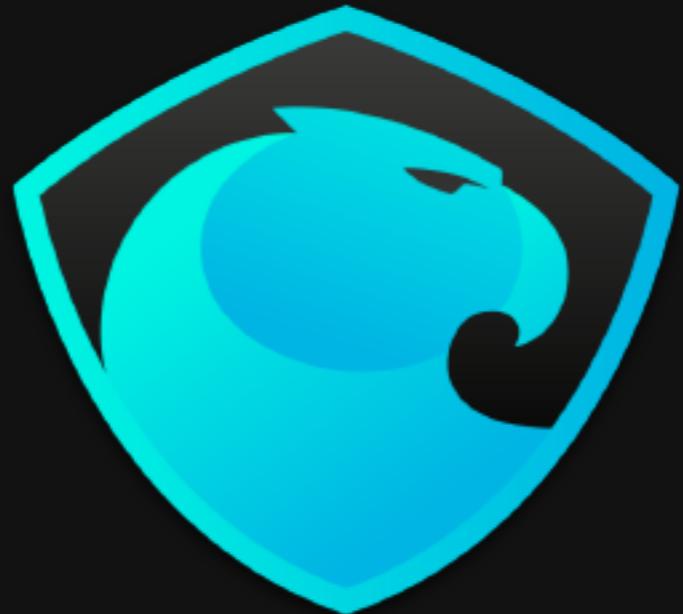
Its own entity stored on top of
Ethereum blockchain

ERC stands for Ethereum Request
for Comments



0x

0x Project



Aragon



district0x



FunFair

ERC721

ERC721

Non-fungible token

ERC721

Non-fungible token

Each token is unique / non divisible
with its own characteristics

ERC721

Non-fungible token

Each token is unique / non divisible
with its own characteristics



Cryptokitties!



A person in a dark suit is performing a handstand on a reflective surface, likely a polished floor or a car hood. The background is a blurred indoor setting.

**IT'S DEVELOP
TIME!**



Documentation sucks

WARNING

Documentation sucks

Few best practices as of now



WARNING

Documentation sucks

Few best practices as of now

Little information on what tools to use



WARNING

Documentation sucks

Few best practices as of now

Little information on what tools to use

Breaking changes can and probably will happen

**DON'T
PANIC**



**2
TOOLS**

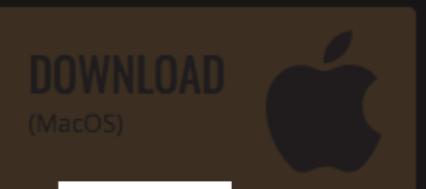


Ganache

ONE CLICK BLOCKCHAIN

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.

The screenshot shows the Ganache application window. At the top, there's a navigation bar with tabs: 'Ganache' (selected), 'ACCOUNTS', 'TRANSACTIONS', and 'LOGS'. Below the tabs, it displays network information: 'CURRENT BLOCK 0', 'GAS PRICE 20000000000', 'GAS LIMIT 6712390', 'NETWORK ID 5777', 'RPC SERVER HTTP://127.0.0.1:7545', and 'MINING STATUS AUTOMINING'. The main area features a blockchain visualization with several blocks. One block is highlighted in brown and labeled 'Ganache'. Below the visualization, there's a mnemonic phrase: 'candy maple cake sugar pudding cream honey rich smooth crumble sweet treat'. To the right, it shows the 'HD PATH' as 'm/44'/60'/0'/0/account_index'. A table below lists an account: 'ADDRESS 0x627306090abaB3A6e1400e9345bC60c78a8BEf57', 'BALANCE 100.00 ETH', 'TX COUNT 0', 'INDEX 0', and a key icon.



truffleframework.com/ganache/

```
(0) 0x4632d1b5f88d3aed78d76523063f142e46cb1122
(1) 0x4430ce7e737e96319b6849ed0fbb89cc616466b3
(2) 0xd4fd8a7adc9030400143f8fc3ca731d6af2e8347
(3) 0x73aaaf73679815917be7f229e65984000cc071aa0
(4) 0xb18d768660524a17f90b8a24a296cbc27fe1e86
(5) 0x8baf0ee2c61b3a01ec3484ddd0f65b88ab04a3aa7
(6) 0x5120bb8059e4c6f62e87f0c430ad932308e9d7e0
(7) 0x811dc4647ef2d7c6363649e98aebe7faec5017e3
(8) 0x3430f25ee29117ff5ee58983470d1e83c75877d
(9) 0x251fe3fc162ca85e24cc73e76a3a6a8f8951eb19
```

Private Keys

```
(0) b45994fd93c4925144df1ebc00d23ca6ee3f19bfccfed4d69068833dbdc287f2
(1) 5a00e08a9e545710ff7ef4c07a90eebd0ffb9db9dd5021883ef11e8bc5b69f5
(2) bef015b0fdf19882a25e53c2bc45be1cc3ee623b167e1ed40c4417656d8fa5d9
(3) 809112213e5e87772bb8f0acf45a9fcade2bb0c79afa02c3444c82a652dda8cb
(4) 388da552b42bdcd6ee45a8d471a233ba00b3f5ab86a7df005d4527a55bb42d3a
(5) 571af57f3120a44af22e0132a0646530c5f4e1c9d82a55542b9993709829bb5d
(6) 01c71f538bfcb1b8454b053121d24ff0d4fa0fda2c430e4d2b44b7844c7a7a0f
(7) 7c05431da0161029ed9b3322e2cb1898d808a23526ba74946b5c28ec10d92c5b
(8) e144efcd7e25be4fc41b7a3d6cef1a53e106fa02eb34632da6b589127acaf27e
(9) 39d8b55ab56eb7e5a762cfb6563d0abe280ddf88a71c8c12df5e8a8e2a228a66
```

HD Wallet

```
Mnemonic:      base raise lab sport again hospital require thumb ladder laugh nominee s
alad
Base HD Path: m/44'/60'/0'/0/{account_index}
```

```
Listening on localhost:8545
```

TESTRPC



ACCOUNTS



BLOCKS



TRANSACTIONS



LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK
3GAS PRICE
20000000000GAS LIMIT
6721975NETWORK ID
5777RPC SERVER
HTTP://127.0.0.1:7545MINING STATUS
5 SEC BLOCK TIME

MNEMONIC

candy maple cake sugar pudding cream honey rich smooth crumble sweet treat

HD PATH

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

ADDRESS

0x627306090abaB3A6e1400e9345bC60c78a8BEf57

BALANCE

100.00 ETH

TX COUNT

0

INDEX

0



ADDRESS

0xf17f52151EbEF6C7334FAD080c5704D77216b732

BALANCE

100.00 ETH

TX COUNT

0

INDEX

1



ADDRESS

0xC5fdf4076b8F3A5357c5E395ab970B5B54098Fef

BALANCE

100.00 ETH

TX COUNT

0

INDEX

2



ADDRESS

0x821aEa9a577a9b44299B9c15c88cf3087F3b5544

BALANCE

100.00 ETH

TX COUNT

0

INDEX

3



ADDRESS

0x0d1d4e623D10F9FBA5Db95830F7d3839406C6AF2

BALANCE

100.00 ETH

TX COUNT

0

INDEX

4



ADDRESS

0x2932b7A2355D6fecc4b5c0B6BD44cC31df247a2e

BALANCE

100.00 ETH

TX COUNT

0

INDEX

5



ADDRESS

0x2191eF87E392377ec08E7c08Eb105Ef5448eCED5

BALANCE

100.00 ETH

TX COUNT

0

INDEX

6



ADDRESS

0x0F4F2Ac550A1b4e2280d04c21cEa7EBD822934b5

BALANCE

100.00 ETH

TX COUNT

0

INDEX

7



ADDRESS

0x6330A553Fc93768F612722BB8c2eC78aC90B3bbc

BALANCE

100.00 ETH

TX COUNT

0

INDEX

8





CURRENT BLOCK 82	GAS PRICE 20000000000	GAS LIMIT 6721975	NETWORK ID 5777	RPC SERVER HTTP://127.0.0.1:7545	MINING STATUS 5 SEC BLOCK TIME	
---------------------	--------------------------	----------------------	--------------------	-------------------------------------	-----------------------------------	--

BLOCK	MINED ON	GAS USED	TRANSACTIONS
BLOCK 51	MINED ON 2018-03-10 14:15:13	GAS USED 26981	1 TRANSACTION
BLOCK 50	MINED ON 2018-03-10 14:15:08	GAS USED 284156	1 TRANSACTION
BLOCK 49	MINED ON 2018-03-10 14:15:03	GAS USED 41981	1 TRANSACTION
BLOCK 48	MINED ON 2018-03-10 14:14:58	GAS USED 269543	1 TRANSACTION
BLOCK 47	MINED ON 2018-03-10 14:14:53	GAS USED 0	NO TRANSACTIONS
BLOCK 46	MINED ON 2018-03-10 14:14:48	GAS USED 0	NO TRANSACTIONS
BLOCK 45	MINED ON 2018-03-10 14:14:43	GAS USED 0	NO TRANSACTIONS
BLOCK 44	MINED ON 2018-03-10 14:14:38	GAS USED 0	NO TRANSACTIONS
BLOCK 43	MINED ON 2018-03-10 14:14:33	GAS USED 0	NO TRANSACTIONS
BLOCK 42	MINED ON 2018-03-10 14:14:28	GAS USED 0	NO TRANSACTIONS
BLOCK 41	MINED ON 2018-03-10 14:14:23	GAS USED 0	NO TRANSACTIONS
BLOCK 40	MINED ON 2018-03-10 14:14:18	GAS USED 0	NO TRANSACTIONS



ACCOUNTS



BLOCKS



TRANSACTIONS



LOGS

SEARCH FOR BLOCK NUMBERS OR TX HASHES

CURRENT BLOCK
62GAS PRICE
20000000000GAS LIMIT
6721975NETWORK ID
5777RPC SERVER
HTTP://127.0.0.1:7545MINING STATUS
5 SEC BLOCK TIME

TX HASH
0xf36163615f41ef7ed8f4a8f192149a0bf633fe1a2398ce001bf44c43dc7bdda0

CONTRACT CALL

FROM ADDRESS 0x627306090abab3a6e1400e9345bc60c78a8bef57	TO CONTRACT ADDRESS 0x8cdaf0cd259887258bc13a92c0a6da92698644c0	GAS USED 26981	VALUE 0
--	---	-------------------	------------

TX HASH
0x937c08c92749efb7348d3b21bd9ba442af69c7c0c827069d4a45c4d78b7b1dcf

CONTRACT CREATION

FROM ADDRESS 0x627306090abab3a6e1400e9345bc60c78a8bef57	CREATED CONTRACT ADDRESS 0x345ca3e014aaaf5dca488057592ee47305d9b3e10	GAS USED 284156	VALUE 0
--	---	--------------------	------------

TX HASH
0xd7bc86d31bee32fa3988f1c1eabce403a1b5d570340a3a9cdba53a472ee8c956

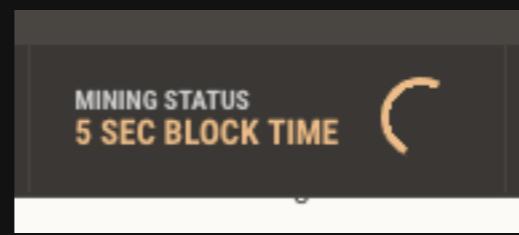
CONTRACT CALL

FROM ADDRESS 0x627306090abab3a6e1400e9345bc60c78a8bef57	TO CONTRACT ADDRESS 0x8cdaf0cd259887258bc13a92c0a6da92698644c0	GAS USED 41981	VALUE 0
--	---	-------------------	------------

TX HASH
0x6de7718d241405256d3b8a3a3f9dd9c5be5d75f4ec23af78e5b19c5f52464103

CONTRACT CREATION

FROM ADDRESS 0x627306090abab3a6e1400e9345bc60c78a8bef57	CREATED CONTRACT ADDRESS 0x8cdaf0cd259887258bc13a92c0a6da92698644c0	GAS USED 269543	VALUE 0
--	--	--------------------	------------



Ganache

SERVER

HOSTNAME
The server will accept requests on this port.

PORT NUMBER

NETWORK ID
Internal blockchain identifier.

AUTOMINE
Process transactions immediately.

MINING BLOCK TIME (SECONDS)
The number of seconds to wait between mining transactions.

RPC SERVER
HTTP://127.0.0.1:7545

HD PATH

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

TX COUNT

4

INDEX

0





METAMASK

METAMASK

[GET CHROME EXTENSION ➔](#)

Chrome Firefox Opera

OR

[GET BRAVE BROWSER ➔](#)

metamask.io

METAMASK



METAMASK



METAMASK



METAMASK



METAMASK



Featured



MetaMask

offered by <https://metamask.io>

★★★★★ (769)

Productivity

1,066,130 users

OVERVIEW

REVIEWS

SUPPORT

Cancel

Add extension

CHECKING...



Add "MetaMask"?

It can:

- Read and change all your data on the websites you visit
- Communicate with cooperating websites
- Modify data you copy and paste

The screenshot shows a browser window with the MetaMask extension installed. The extension's UI is overlaid on a social media-like feed. At the top right of the extension's UI, it says "METAMASK" and shows a balance of "0.867740 ETH". Below this, there are four transaction items listed with dates and amounts. At the bottom right of the extension's UI, there are "BUY" and "SEND" buttons.

Compatible with your device

Ethereum Browser Extension

MetaMask is an extension for accessing Ethereum enabled distributed applications, or "Dapps" in your normal Chrome browser!

The extension injects the Ethereum web3 API into every website's javascript context, so that dapps can read from the blockchain.

MetaMask also lets the user create and manage their own identities, so when a Dapp wants to perform a transaction and write to the blockchain, the user gets a secure interface to review the transaction, before approving or rejecting it.

Website

Report Abuse

Additional Information

Version: 4.2.0

Updated: March 6, 2018

Size: 5.38MiB

Languages: See all 6

RELATED

MyEtherWallet

★★★★★ (210)



Some Rich Asshole

★★★★★ (64)



EtherAddressLookup

★★★★★ (57)



Cryptonite by MetaCert

★★★★★ (113)





METAMASK BETA

Main Network ▾

Please be aware that this version is still under development

Create Password

New Password (min 8 characters)

Confirm Password

CREATE

[Import with seed phrase](#)

• • •



MetaMask is a secure identity vault for Ethereum.

It allows you to hold ether & tokens, and interact with decentralized applications.



ACCOUNTS



BLOCKS



TRANSACTIONS

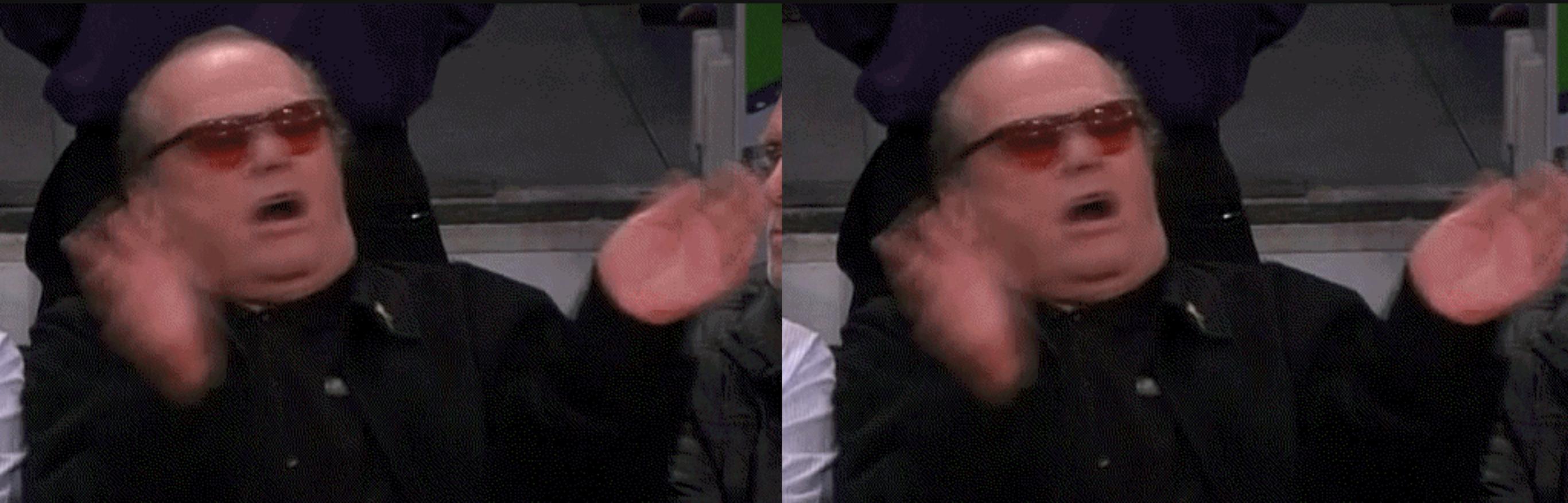


LOGS

CURRENT BLOCK
615GAS PRICE
20000000000GAS LIMIT
6721975NETWORK ID
5777RPC SERVER
HTTP://127.0.0.1:7545MINING STATUS
5 SEC BLOCK TIME

MNEMONIC

candy maple cake sugar pudding cream honey rich smooth crumble sweet treat



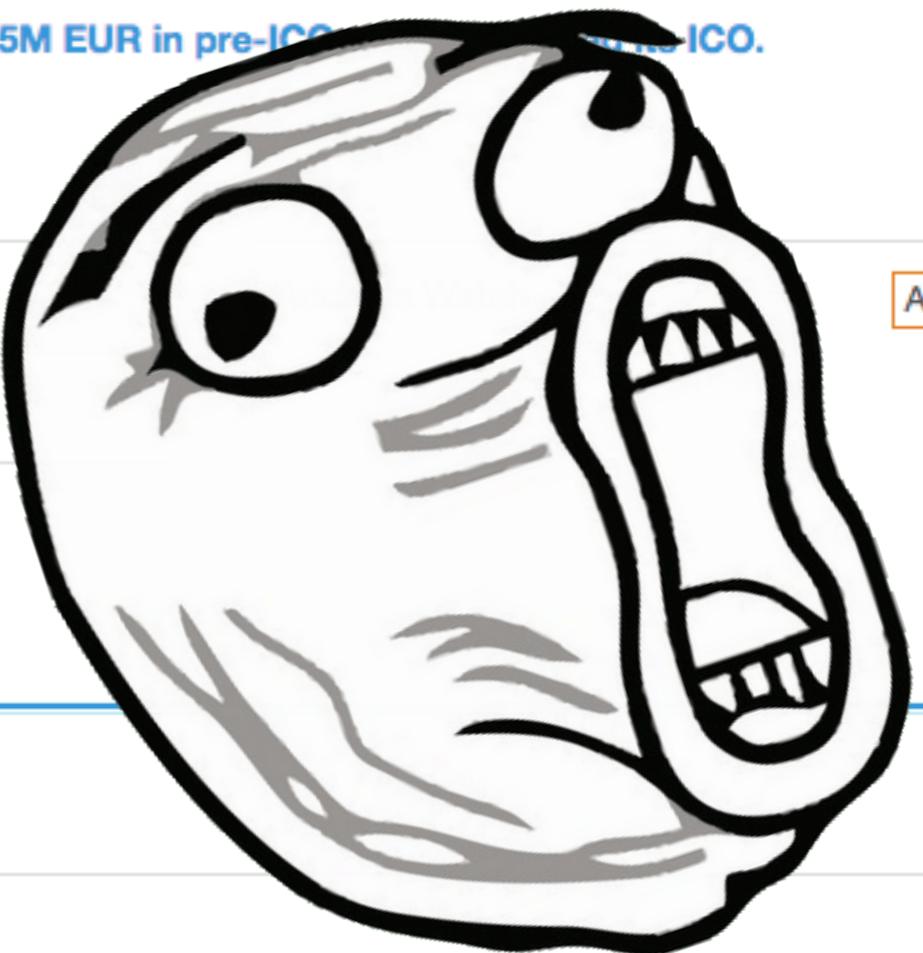
Overview

ETH Balance: 0.58094082882303356 Ether

[Add To Watch List](#)

ETH USD Value: \$484.35 (@ \$833.73/ETH)

No Of Transactions: 38 txns



[Transactions](#) [Comments](#)

↓ Latest 25 txns from a total Of [38 transactions](#)

TxHash	Block	Age	From		Value
0x54b2828f130d65...	5072173	3 hrs 48 mins ago	0x627306090abab3...	IN	0x2d7311279a3ba8... 0.0000545454
0x3890afa938fb7d8...	5053565	3 days 6 hrs ago	0xf17f52151ebef6c...	IN	0x2d7311279a3ba8... 0.0000909090
0x76739de44466f1...	5052969	3 days 8 hrs ago	0x627306090abab3...	IN	0x2d7311279a3ba8... 0.0019051249
0xa81ae159719cb0...	5049911	3 days 21 hrs ago	0x627306090abab3...	IN	0x2d7311279a3ba8... 0.0081818181
0x8705aac42769a4...	5049079	4 days 39 mins ago	0x627306090abab3...	IN	0x2d7311279a3ba8... 0.0001160000
0xa0f39daa1448d2...	5047550	4 days 6 hrs ago	0x627306090abab3...	IN	0x2d7311279a3ba8... 0.0008462499
0xddc8584badf032...	5047310	4 days 7 hrs ago	0x627306090abab3...	IN	0x2d7311279a3ba8... 0.0000000000
0x540f32df03512b5...	5043167	5 days 26 mins ago	0x627306090abab3...	IN	0x2d7311279a3ba8... 0.0001818181
0xcc4b57a275777af...	5041756	5 days 6 hrs ago	0x627306090abab3...	IN	0x2d7311279a3ba8... 0.0004766835



Terms of Use

Terms of Use

THIS AGREEMENT IS SUBJECT TO BINDING ARBITRATION AND A WAIVER OF CLASS ACTION RIGHTS AS DETAILED IN SECTION 13. PLEASE READ THE AGREEMENT CAREFULLY.

Our Terms of Use have been updated as of September 5, 2016

1. Acceptance of Terms

MetaMask provides a platform for managing Ethereum (or "ETH") accounts, and allowing ordinary websites to interact with the Ethereum blockchain, while keeping the user in control over what transactions they approve, through our website located at <https://metamask.io/> and browser plugin (the "Site") — which includes text, images, audio, code and other materials (collectively, the "Content") and all of the features, and services provided. The Site, and any other features, tools, materials, or other services offered from time to time by MetaMask are referred to here as the "Service." Please read these Terms of Use (the "Terms" or "Terms of Use") carefully before using the Service. By using or otherwise accessing the Services, or clicking to accept or agree to these Terms where that option is made available, you (1) accept and agree to these Terms (2) consent to the collection, use, disclosure and other handling of information as described in our Privacy Policy and (3) any additional terms, rules and conditions of participation issued by MetaMask from time to time. If you do not agree to the Terms, then you may not access or use the Content or Services.

2. Modification of Terms of Use

ACCEPT

○ ○ ●



METAMASK **BETA**

Main Network ▾



Account 1

DETAILS

0x6a...6520



0 ETH



0 ETH

Transactions

DEPOSIT

SEND

No Transactions

Add Token



Main Network ▾



Networks

The default network for Ether transactions
is Main Net.

- Main Ethereum Network**
- Ropsten Test Network
- Kovan Test Network
- Rinkeby Test Network
- Localhost 8545
- Custom RPC



METAMASK **BETA**

Main Network ▾



Settings

Info



Current Conversion

Updated Sat Mar 10 2018 14:58:36 GMT-0500 (EST)

USD - United States Dollar

New RPC URL

`http://127.0.0.1:7545`

SAVE

Ganache
RPC Server

RPC SERVER
HTTP://127.0.0.1:7545

?

Private Network



My Accounts

Log out



DEPOSIT
Account 1

0.000000 ETH

SEND

+

Create Account

↓

Import Account

ⓘ

Info & Help

⚙

Settings

HD PATH

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

TX COUNT

4

INDEX

0



6C7334FAD080c5704D77216b732

BALANCE

100.00 ETH

TX COU

0

A5357c

0x627306090abaB3A6e1400e9345bC60c78a8BEf57

TX COU

0

b44299

PRIVATE KEY

c87509a1c067bbde78beb793e6fa76530b6382a4c0241e5e4a9ec0a0f44dc0d3

DONE

TX COU

0

9FBA5D

Fecc4b5c0B6BD44cC31df247a2e

BALANCE

100.00 ETH

TX COU

0

TX COU

0



METAMASK **BETA**

?

Private Network



New Account

Create Import

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 **BETA**

?

Private Network



IMPORTED



Account 2

DETAILS

0x62...ef57



99.937 ETH
71254.60 USD

Add Token



99.937 ETH
71254.60 USD

Transactions

No Transactions



DEPOSIT

SEND



TRUFFLE

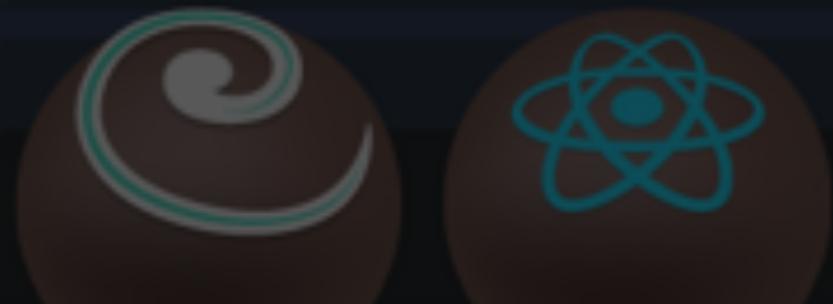
truffleframework.com

INSTALL TRUFFLE

```
MP/htdocs/awesome-eth-app ➔ npm install -g truffle█
```

DOWNLOAD REACT BOX

```
/htdocs/awesome-eth-app ➔ truffle unbox react
```



LOTS OF BOXES



Status

A Mobile Ethereum OS

status-im/ truffle-box-status

★ Star

39

This box comes with everything you need to start using smart contracts from a react app on your mobile. Of course, testing of this box requires you to have iOS/Android device with Status installed on it.

status react webpack webapp



Quintor/ angular-truffle-box

★ Star

26

This Truffle Box provides a base for working with the Truffle Framework and Angular. It provides a basic working example of the MetaCoin contracts with Angular components. This project is generated with Angular CLI.

angular



ENS · BID

The Best ENS Trading Market

ens-bid/ ens-bid-truffle-box

★ Star

4

This box comes with everything you need to start using smart contracts on Ethereum blockchain and interact with MetaMask to send transactions.

material-ui react redux sass



DON'T PANIC

```
npm ERR! npm  v3.10.9
npm ERR! code ELIFECYCLE

npm ERR! scrypt@6.0.3 install: `node-gyp rebuild`
npm ERR! Exit status 1
npm ERR!
npm ERR! Failed at the scrypt@6.0.3 install script 'node-gyp rebuild'.
npm ERR! Make sure you have the latest version of node.js and npm installed.
npm ERR! If you do, this is most likely a problem with the scrypt package,
npm ERR! not with npm itself.
npm ERR! Tell the author that this fails on your system:
npm ERR!   node-gyp rebuild
npm ERR! You can get information on how to open an issue for this project with:
npm ERR!   npm bugs scrypt
npm ERR! Or if that isn't available, you can get their info via:
npm ERR!   npm owner ls scrypt
npm ERR! There is likely additional logging output above.

npm ERR! Please include the following file with any support request:
npm ERR!   /Applications/MAMP/htdocs/awesome-eth-app/npm-debug.log

at ChildProcess.exithandler (child_process.js:211:12)
at emitTwo (events.js:106:13)
at ChildProcess.emit (events.js:191:7)
at maybeClose (internal/child_process.js:885:16)
at Process.ChildProcess._handle.onexit (internal/child_process.js:226:5)
```

TRUFFLE COMPILE

```
x ryanhagerty@Ryans-MBP ➤ /Applications/MAMP/htdocs/awesome-eth-app ➤ truffle compile  
Compiling ./contracts/Migrations.sol...  
Compiling ./contracts/SimpleStorage.sol...  
Writing artifacts to ./build/contracts
```

TRUFFLE MIGRATE

```
ryanhagerty@Ryans-MBP ➤ /Applications/MAMP/htdocs/awesome-eth-app ➤ truffle migrate
Error: No network specified. Cannot determine current network.
at Object.detect (/usr/local/lib/node_modules/truffle/build/webpack:~/truffle-core/lib/environment.js:31:1)
at /usr/local/lib/node_modules/truffle/build/webpack:~/truffle-core/lib/commands/migrate.js:91:1
at finished (/usr/local/lib/node_modules/truffle/build/webpack:~/truffle-workflow-compile/index.js:53:1)
at /usr/local/lib/node_modules/truffle/build/webpack:~/truffle-compile/index.js:301:1
at /usr/local/lib/node_modules/truffle/build/webpack:~/truffle-compile/profiler.js:157:1
at /usr/local/lib/node_modules/truffle/build/webpack:~/async/dist/async.js:3874:1
at /usr/local/lib/node_modules/truffle/build/webpack:~/async/dist/async.js:473:1
at replenish (/usr/local/lib/node_modules/truffle/build/webpack:~/async/dist/async.js:993:1)
at iterateeCallback (/usr/local/lib/node_modules/truffle/build/webpack:~/async/dist/async.js:983:1)
at /usr/local/lib/node_modules/truffle/build/webpack:~/async/dist/async.js:958:1
```



DON'T FORGET GANACHE

The screenshot shows the Ganache interface with the following details:

ADDRESS	BALANCE	TX COUNT	INDEX	Key
0x627306090abaB3A6e1400e9345bC60c78a8BEf57	100.00 ETH	0	0	🔑
0xf17f52151EbEF6C7334FAD080c5704D77216b732	100.00 ETH	0	1	🔑
0xC5fdf4076b8F3A5357c5E395ab970B5B54098Fef	100.00 ETH	0	2	🔑
0x821aEa9a577a9b44299B9c15c88cf3087F3b5544	100.00 ETH	0	3	🔑
0x0d1d4e623D10F9FBA5Db95830F7d3839406C6AF2	100.00 ETH	0	4	🔑
0x2932b7A2355D6fecc4b5c0B6BD44cC31df247a2e	100.00 ETH	0	5	🔑
0x2191eF87E392377ec08E7c08Eb105Ef5448eCED5	100.00 ETH	0	6	🔑

MNEMONIC: candy maple cake sugar pudding cream honey rich smooth crumble sweet treat
HD PATH: m/44'/60'/0'/0/account_index

CURRENT BLOCK: 3
GAS PRICE: 200000000000
GAS LIMIT: 6721975
NETWORK ID: 5777
RPC SERVER: HTTP://127.0.0.1:7545
MINING STATUS: 5 SEC BLOCK TIME

SET OUR NETWORK

```
JS truffle.js  ×  
1 module.exports = {  
2   // See <http://truffleframework.com/docs/advanced/configuration>  
3   // to customize your Truffle configuration!  
4 };  
5
```

SET OUR NETWORK

RPC SERVER
HTTP://127.0.0.1:7545

JS truffle.js

```
1 module.exports = {
2   networks: {
3     development: {
4       host: "127.0.0.1",
5       port: 7545,
6       network_id: "*" // Match any network id
7     }
8   }
9};
```

GREAT SUCCESS!

```
✖ ryanhagerty@Ryans-MBP ➤ /Applications/MAMP/htdocs/awesome-eth-app ➤ truffle migrate  
Using network 'development'.
```

```
Running migration: 1_initial_migration.js
```

```
Deploying Migrations...
```

```
... 0x61ca4447d9c15f40d6182447f96bde374591c722770f3be61f46c619476fc679
```

```
Migrations: 0x8cdaf0cd259887258bc13a92c0a6da92698644c0
```

```
Saving successful migration to network...
```

```
... 0xd7bc86d31bee32fa3988f1c1eabce403a1b5d570340a3a9cdba53a472ee8c956
```

```
Saving artifacts...
```

```
Running migration: 2_deploy_contracts.js
```

```
Deploying SimpleStorage...
```

```
... 0x19d8b43872c3d1e6c432d9d2e1df8838f81e350eaec199fcfa566debc38556bf
```

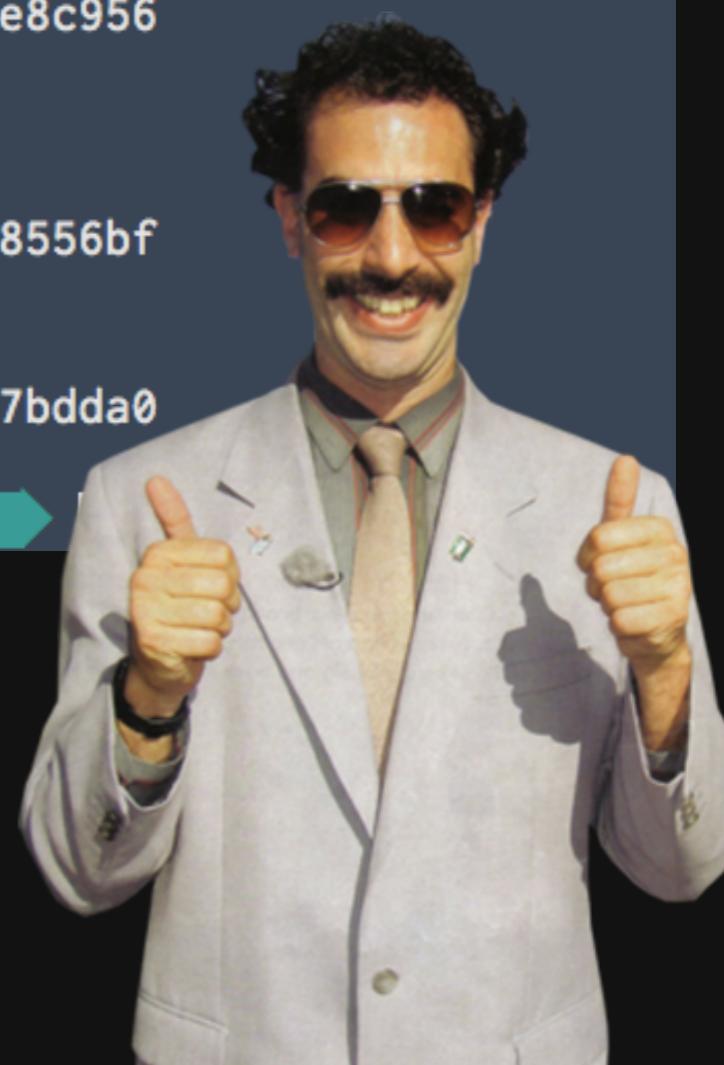
```
SimpleStorage: 0x345ca3e014aa5dca488057592ee47305d9b3e10
```

```
Saving successful migration to network...
```

```
... 0xf36163615f41ef7ed8f4a8f192149a0bf633fe1a2398ce001bf44c43dc7bdda0
```

```
Saving artifacts...
```

```
ryanhagerty@Ryans-MBP ➤ /Applications/MAMP/htdocs/awesome-eth-app ➤
```



GREAT SUCCESS!

● ● ●

Ganache

ACCOUNTS BLOCKS TRANSACTIONS LOGS SEARCH FOR BLOCK NUMBERS

CURRENT BLOCK 192	GAS PRICE 2000000000	GAS LIMIT 6721975	NETWORK ID 5777	RPC SERVER HTTP://127.0.0.1:7545	MINING STATUS 5 SEC BLOCK TIME	
----------------------	-------------------------	----------------------	--------------------	-------------------------------------	-----------------------------------	---

MNEMONIC

candy maple cake sugar pudding cream honey rich smooth crumble sweet treat

ADDRESS

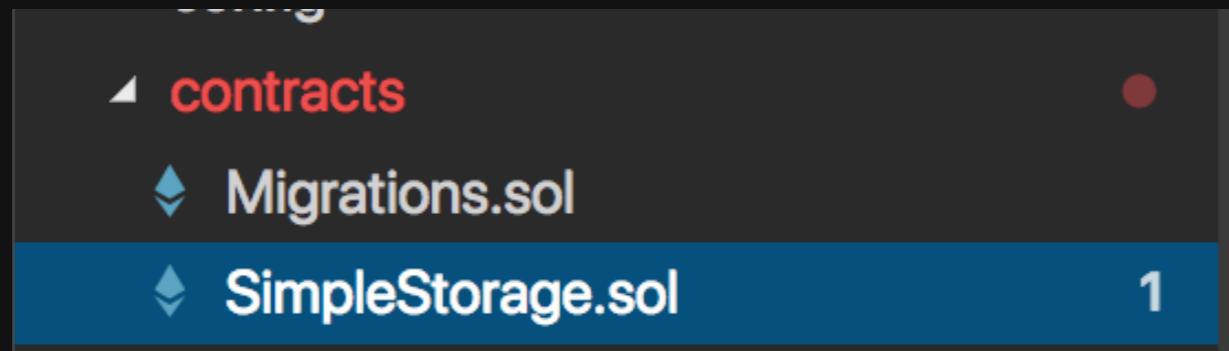
0x627306090abaB3A6e1400e9345bC60c78a8BEf57

BALANCE

99.96 ETH



INCLUDED SMART CONTRACT



```
❖ SimpleStorage.sol ✘
1 pragma solidity ^0.4.18;
2
3 contract SimpleStorage {
4     uint storedData;
5
6     function set(uint x) public {
7         storedData = x;
8     }
9
10    function get() public view returns (uint) {
11        return storedData;
12    }
13 }
```

GET IT RUNNING

```
/Applications/MAMP/htdocs/awesome-eth-app ➔ npm run start
```

Truffle Box

Good to Go!

Your Truffle Box is installed and ready.

Smart Contract Example

If your contracts compiled and migrated successfully, below will

Try changing the value stored on line 59 of App.js.

The stored value is: 0





SOLIDITY

SOLIDITY BASICS

Statically typed

```
contract SimpleStorage {  
    uint storedData;  
  
    function set(uint x) public {  
        storedData = x;  
    }  
  
    function get() public view returns (uint) {  
        return storedData;  
    }  
}
```

SOLIDITY BASICS

“Contracts in Solidity are similar to classes in object-oriented languages.”

```
contract SimpleStorage {
    uint storedData;

    function set(uint x) public {
        storedData = x;
    }

    function get() public view returns (uint) {
        return storedData;
    }
}
```

SOLIDITY BASICS

Similar to JavaScript!

```
contract SimpleStorage {
    uint storedData;

    function set(uint x) public {
        storedData = x;
    }

    function get() public view returns (uint) {
        return storedData;
    }
}
```

SOLIDITY BASICS

structs similar to objects

```
struct Person {  
    uint age;  
    string name;  
    string profession;  
}
```

SOLIDITY



SOLIDITY



STATE

SOLIDITY



STATE FUNCTIONS



SOLIDITY

The logo features the word "SOLIDITY" in a bold, white, sans-serif font. Above the text is a graphic element consisting of three nested, overlapping triangles. The top triangle is light gray, the middle one is medium gray, and the bottom one is dark gray. To the right of the triangles is a large, white question mark. Below the text is a white circle.

BYTECODE

BYTECODE

```
"6060604052341561000f57600080
fd5b6040805190810160405280600
c81526020017f48656c6c6f20576f
726c6421000000000000000000000000
00000000000000000000000000000000
908051906020019061005a9291906
10060565b50610105565b82805460
01816001161561010002031660029
00490600052602060002090601f01
6020900481019282601f106100a15
7805160ff19168380011785556100
```

OPCODES

0x30	ADDRESS	Get address of currently executing account
0x31	BALANCE	Get balance of the given account
0x32	ORIGIN	Get execution origination address
0x33	CALLER	Get caller address. This is the address of the account that initiated the current call.
0x34	CALLVALUE	Get deposited value by the instruction/transaction responsible for the current call.
0x35	CALLDATALOAD	Get input data of current environment
0x36	CALLDATASIZE	Get size of input data in current environment
0x37	CALLDATACOPY	Copy input data in current environment to memory. This pertains to the current call.
0x38	CODESIZE	Get size of code running in current environment
0x39	CODECOPY	Copy code running in current environment to memory
0x3a	GASPRICE	Get price of gas in current environment
0x3b	EXTCODESIZE	Get size of an account's code
0x3c	EXTCODECOPY	Copy an account's code to memory

list of opcodes

OUR PROJECT

"6060604052341561000f57600080
fd5b6040805190810160405280600
c81526020017f48656c6c6f20576f
726c6421000000000000000000000000
00000000000000000000000000000000
908051906020019061005a9291906
10060565b50610105565b82805460
01816001161561010002031660029
00490600052602060002090601f01
6020900481019282601f106100a15
7805160ff19168380011785556100

6060604052

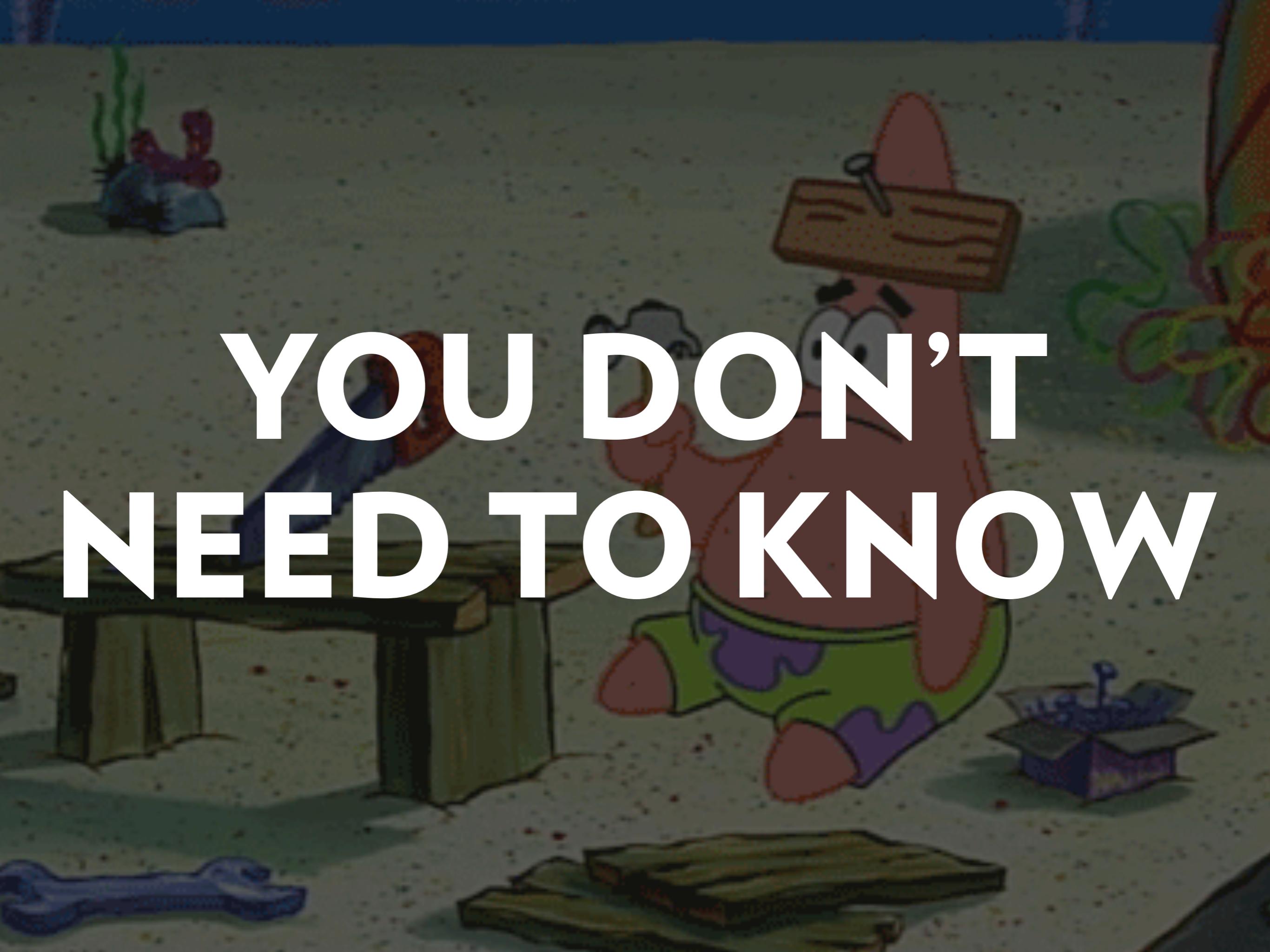
60606040 PUSH1 X3

BLOCKHASH

Store 0x60 at memory location 0x40.

52 MSTORE

Save word to memory

A vibrant, hand-drawn style illustration of a child's bedroom. In the center is a large brown wooden bed with a red and white checkered blanket. To the left, a wooden bookshelf is filled with books of various colors. A small blue toy car sits on the floor to the left. On the right, there's a stack of books and a green chair. A large, stylized title 'YOU DON'T NEED TO KNOW' is overlaid in the middle-left area.

YOU DON'T
NEED TO KNOW

A man with dark hair and a mustache, wearing a white dress shirt and a dark tie, is looking upwards and slightly to his left. He is holding a small, blue, spherical object in his right hand. In his left hand, he holds a dark, rectangular device with a screen and several buttons. The background is a plain, light-colored wall.

SECURITY

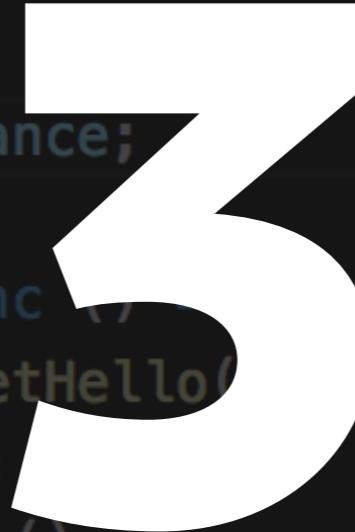
SECURITY

“every execution of a smart contract is publicly visible”

Security Considerations

Current Best Practices

```
class ContractInput extends React.Component {  
  submit(e) {  
    e.preventDefault();  
    const message = this.message.value;  
    const state = this.props.state;  
    const web3 = state.web3;  
    const instance = state.instance;  
  
    const setHelloRequest = async () => {  
      const result = await instance.setHello(message, { from: state.web3.eth.accounts[0] });  
      this.props.initModal(0);  
      return instance.getHello();  
    };  
    return result();  
  }  
  const getHelloRequest = async () => {  
    this.props.initModal(1);  
    const result = await setHelloRequest();  
    this.props.updateHello(result);  
  }  
  getHelloRequest();  
}
```



PROJECT

WHAT WE'RE GOING TO DO



WHAT WE'RE GOING TO DO

1. Deploy our contract on our testnet

WHAT WE'RE GOING TO DO

1. Deploy our contract on our testnet
2. See our predefined hello world message stored on the blockchain

WHAT WE'RE GOING TO DO

1. Deploy our contract on our testnet
2. See our predefined hello world message stored on the blockchain
3. Take user input from React component to change our message and store it!

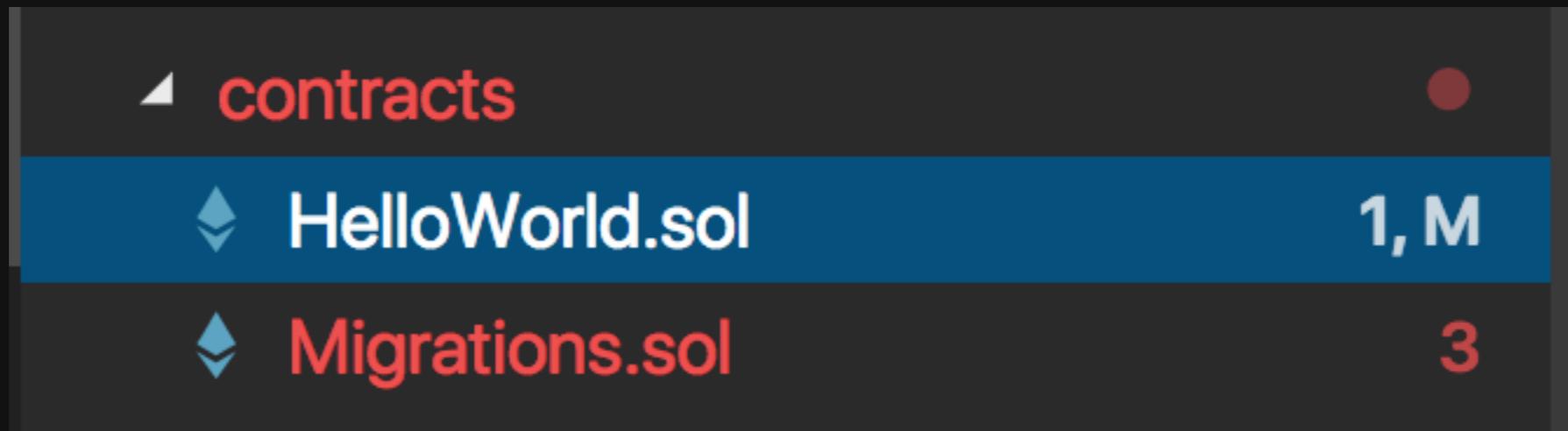


**DON'T
FORGET!**

SIX STEPS

1. Start Ganache
2. Unlock MetaMask with Local Network
3. Switch Accounts
4. truffle compile
5. truffle migrate
6. npm run start

OUR CONTRACT



App.js

```
import HelloWorldContract from '../build/contracts/HelloWorld.json'
```

OUR CONTRACT

```
pragma solidity ^0.4.18;

contract HelloWorld {
    string hello;

    function HelloWorld() public {
        hello = "Hello World!";
    }

    function setHello(string _hello) public {
        hello = _hello;
    }

    function getHello() public view returns (string) {
        return hello;
    }
}
```

PRAGMA & CONTRACT

```
pragma solidity ^0.4.18;  
  
contract HelloWorld {  
    string hello;  
}
```

CONSTRUCTOR

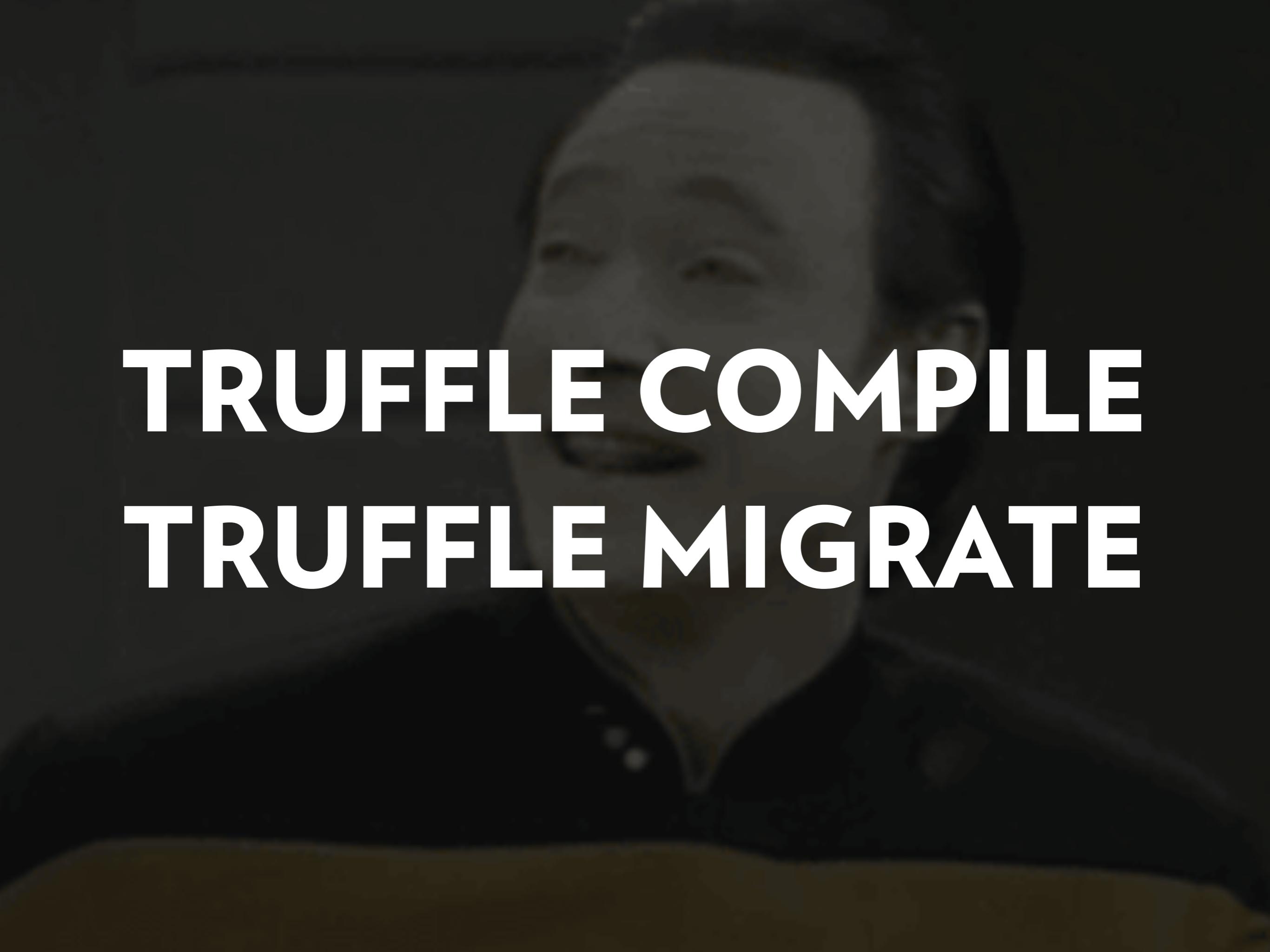
```
function HelloWorld() public {  
    hello = "Hello World!";  
}
```

SETHELLO()

```
function setHello(string _hello) public {  
    hello = _hello;  
}
```

GETHELLO()

```
function getHello() public view returns (string) {  
    return hello;  
}
```



TRUFFLE COMPILE
TRUFFLE MIGRATE

APP.JS

```
import React, { Component } from 'react' 22.2K (gzipped: 7.4K)
import HelloWorldContract from '../build/contracts/HelloWorld.json'
import getWeb3 from './utils/getWeb3'
import ContractInput from './components/ContractInput'
import Modal from './components/Modal'

import './css/roboto.css'
import './css/rubik.css'
import './css/milligram.min.css'
import './App.css'

class App extends Component {
  constructor(props) {
    super(props)
    this.updateHello = this.updateHello.bind(this);
    this.initModal = this.initModal.bind(this);

    // ^ Change initial states and add new ones here.
    this.state = {
      hello: "I'm waiting to say hello...",
      contractAddress: "Waiting on contract address...",
      modal: 0,
```

WHAT WE NEED

1. Import everything we need.
2. Set our initial state.
3. Get web3
4. Instantiates our contract
5. Renders our HTML/components

Hello World

Our First Smart Contract

If your contracts compiled and migrated successfully, we'll show your contract address and the hello message below.

Your contract address is:

0x8c7ef141e529c5263e2a45581d1c8a39f64dc5df

The hello message from your contract is:

Hello World!

Hello World text to change

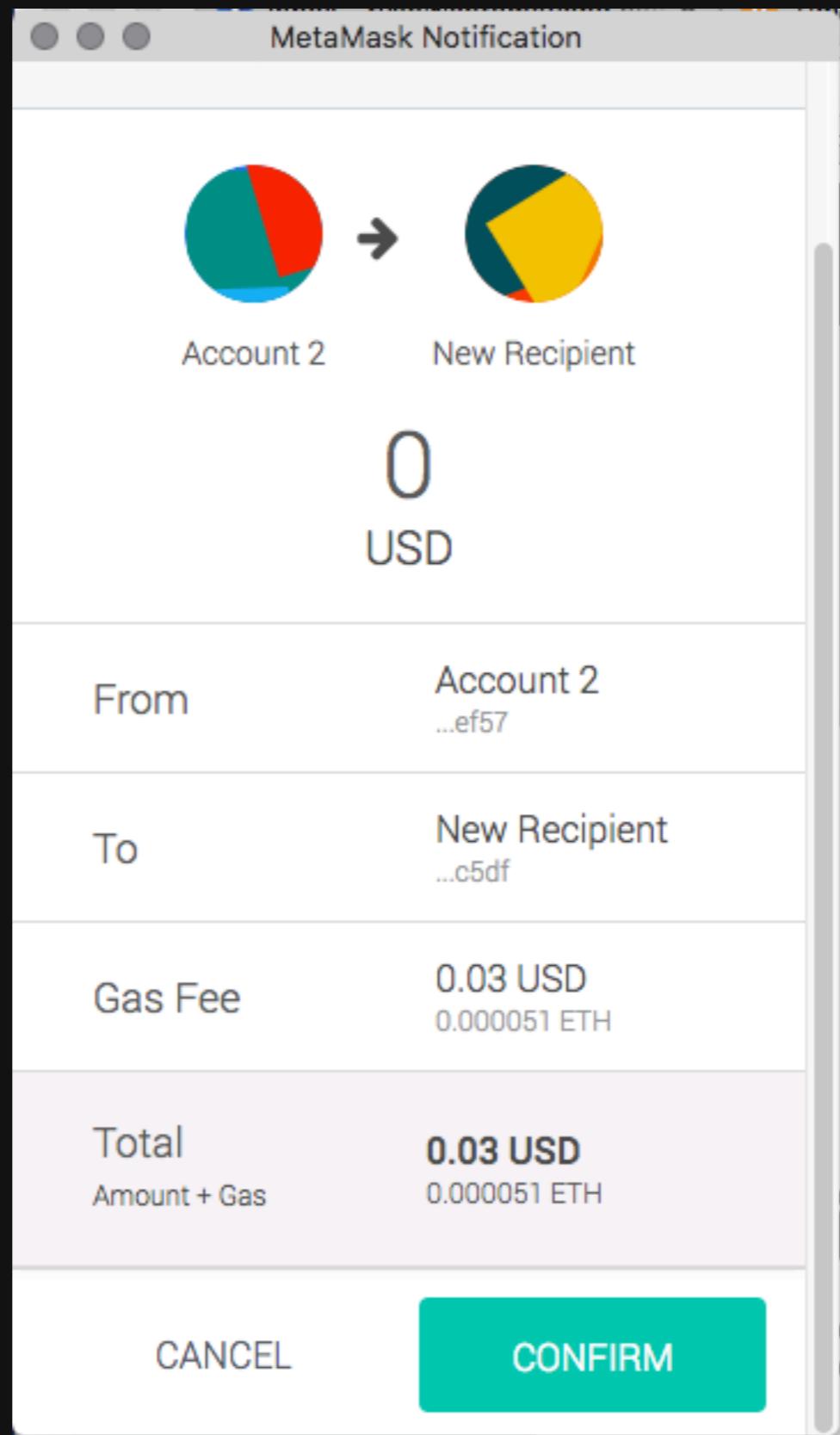
SUBMIT

The hello message from your contract is:

Hello World!

HELLLOOOO NASHVILLE

SUBMIT





**Waiting on latest block
to mine...**

Hello World!

HELLLOOOO NASHVILLE

SUBMIT

The hello message from your contract is:

HELLLOOOO NASHVILLE

HELLLOOOO NASHVILLE

SUBMIT



IMPORT

```
import React, { Component } from 'react' 22.2K (gzipped: 7.4K)
import HelloWorldContract from '../build/contracts/HelloWorld.json'
import getWeb3 from './utils/getWeb3'
import ContractInput from './components/ContractInput'
import Modal from './components/Modal'

import './css/roboto.css'
import './css/rubik.css'
import './css/milligram.min.css'
import './App.css'
```

SET STATE

```
this.state = {  
  hello: "I'm waiting to say hello...",  
  contractAddress: "Waiting on contract address...",  
  modal: 0,  
  instance: null,  
  web3: null  
}
```

GET WEB3

```
componentWillMount() {  
  // Get network provider and web3 instance.  
  // See utils/getWeb3 for more info.  
  getWeb3  
    .then(results => {  
      this.setState({  
        web3: results.web3  
      })  
  
      // Instantiate contract once web3 provided.  
      this.instantiateContract()  
    })  
    .catch(() => {  
      console.log('Error finding web3.')  
    })  
}
```

GET WEB3

Injected web3 detected.

[getWeb3.js:18](#)

[App.js:69](#)

```
▼ Web3 {_requestManager: RequestManager, currentProvider: MetamaskInpageProvider, eth:  
  ▼ Eth, db: DB, shh: Shh, ...} ⓘ  
  ► currentProvider: MetamaskInpageProvider {mux: e.exports, publicConfigStore: e, rpcEngin  
  ► db: DB {_requestManager: RequestManager, putString: f, getString: f, putHex: f, getHex:  
  ▼ eth: Eth  
    accounts: (...)  
    blockNumber: (...)  
    ► call: f ()  
    coinbase: (...)  
    ► compile: {solidity: f, lll: f, serpent: f}  
    ► estimateGas: f ()  
    gasPrice: (...)  
    ► getAccounts: f (callback)  
    ► getBalance: f ()  
    ► getBlock: f ()  
    ► getBlockNumber: f (callback)  
    ► getBlockTransactionCount: f ()  
    ► getBlockUncleCount: f ()  
    ► getCode: f ()  
    ► getCoinbase: f (callback)
```

INSTANTIATE CONTRACT

```
instantiateContract() {  
    const contract = require('truffle-contract') 217.2K (gzipped: 67.4K)  
    const helloWorld = contract(HelloWorldContract)  
    let helloWorldInstance  
    helloWorld.setProvider(this.state.web3.currentProvider)  
  
    helloWorld.deployed().then((instance) => {  
        helloWorldInstance = instance  
        this.setState({ instance: helloWorldInstance })  
        this.setState({ contractAddress: helloWorldInstance.address })  
  
        return helloWorldInstance.getHello()  
    }).then((result) => {  
        return this.setState({ hello: result })  
    })  
}
```

INstantiate CONTRACT

Injected web3 detected.

[getWeb3.js:18](#)

```
▼ TruffleContract {constructor: f, abi: Array(3), contract: Contract, setHello: f, getHello: f, ...} ⓘ
  ► abi: (3) [{...}, {...}, {...}]
    address: "0x8065f4c7b8c2bf53561af92d9da2ea022a0b28ca"
  ► allEvents: f ()
  ► constructor: f TruffleContract()
  ► contract: Contract {_eth: Eth, transactionHash: null, address: "0x8065f4c7b8c2bf53561af92d9da2ea022a0b28ca"}
  ► getHello: f ()
  ► send: f (value)
  ► sendTransaction: f ()
  ► setHello: f ()
    transactionHash: null
  ► __proto__: Contract
```

> |

RENDER

```
render() {
  return (
    <div className="App">
      <div className="top-bar">
        <a href="#" className="title-link"> Ethereum and React</a>
        <div className="notice-box">Looks like Truffle React Box is up and running <img alt="two thumbs up" style={{"width: 20px; height: 20px;}}/></div>
      </div>

      <main className="container">
        <h1>Hello World</h1>
        <h2>Our First Smart Contract</h2>
        <div className="contract-status">
          <p>If your contracts compiled and migrated successfully, we'll show your contract address here</p>
          <div>Your contract address is: <span className="contract-address">{this.state.contractAddress}</span></div>
        </div>
        <p className="message">The hello message from your contract is: <strong>{this.state.hello}</strong></p>
        <ContractInput state={this.state} updateHello={this.updateHello} initModal={this.initModal} />
      </main>
      <Modal modal={this.state.modal} />
    </div>
  );
}
```

CONTRACTINPUT.JS

```
render() {
  return (
    <form className="hello-form" onSubmit={(e) => this.submit(e)}>
      <input ref={(input) => this.message = input} type="text" className="he
      <button type="submit" value="Submit" className="button-submit js-button">
    </form>
  )
}
```

CONTRACTINPUT.JS

```
    submit(e) {
      e.preventDefault();
      const message = this.message.value;
      const state = this.props.state;
      const instance = state.instance;

      const setHelloRequest = async () => {
        const result = instance.setHello(message,
          this.props.initModal(0));
        return instance.getHello()
      };
      return result
    }

    const getHelloRequest = async () => {
      this.props.initModal(1);
      const result = await setHelloRequest();
      this.props.updateHello(result);
    }

    getHelloRequest();
  }
}
```

CONTRACTINPUT.JS

```
const getHelloRequest = async () => {
  this.props.initModal(1);
  const result = await setHelloRequest();
  this.props.updateHello(result);
}

getHelloRequest();
```

CONTRACTINPUT.JS

```
const setHelloRequest = async () => {
  const result = instance.setHello(message, { from: state.web3.eth.accounts[0]}).then((result) => {
    this.props.initModal(0);
    return instance.getHello()
  });
  return result
}
```



DEMO TIME



TESTING

TESTS/HELLOWORLD.JS

```
var HelloWorld = artifacts.require("./HelloWorld.sol");

contract('HelloWorld', function(accounts) {

  it("...should set and get the Hello World value", function() {
    return HelloWorld.deployed().then(function(instance) {
      helloWorldInstance = instance;

      return helloWorldInstance.setHello('This is a hello test', {from: accounts[0]});
    }).then(function() {
      return helloWorldInstance.getHello.call();
    }).then(function(storedData) {
      assert.equal(storedData, 'This is a hello test', 'Uh-oh, it did not set the Hello');
    });
  });

});
```

TESTS/HELLOWORLD.JS

```
var HelloWorld = artifacts.require("./HelloWorld.sol");

contract('HelloWorld', function(accounts) {
```

TESTS/HELLOWORLD.JS

```
it("...should set and get the Hello World value", function() {  
  return HelloWorld.deployed().then(function(instance) {  
    helloworldInstance = instance;
```

TESTS/HELLOWORLD.JS

```
return helloworldInstance.setHello('This is a hello test', {from: accounts[0]});  
}).then(function() {  
    return helloworldInstance.getHello.call();  
}).then(function(storedData) {  
    assert.equal(storedData, 'This is a hello test', 'Uh-oh, it did not set the Hello');  
});
```

TRUFFLE TEST

```
Using network 'development'.
```

```
Compiling ./contracts/HelloWorld.sol...
```

```
Contract: HelloWorld
```

```
✓ ...should set and get the Hello World value (5128ms)
```

```
1 passing (5s)
```





DEPLOYMENT

DEPLOYMENT

Local → Development → Prod

DEPLOYMENT

Local → Development → Prod

Local → Testnet → Mainnet

DEPLOYMENT

Local → Development → Prod

Local → Testnet → Mainnet

Ropsten

Kovan

Rinkeby

ETHEREUM & REACT

WHAT DID WE LEARN?

Blockchain

Ethereum & Smart Contracts

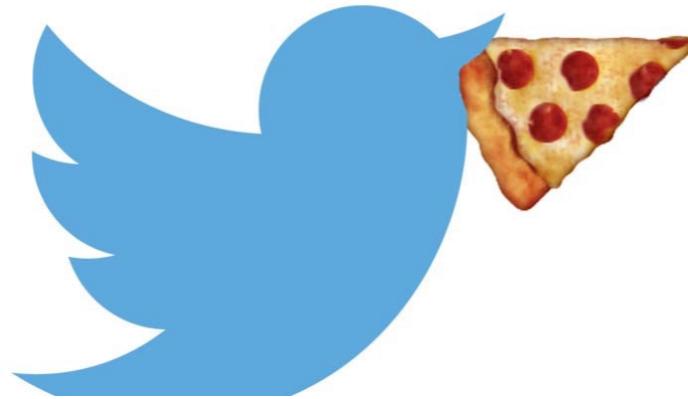
Tools & Frameworks You Need

Basics of Solidity

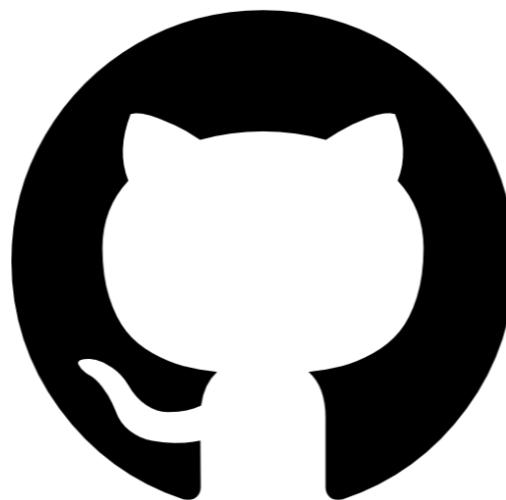
Sample Hello World Project

React Components with Ethereum/web3

Testing



twitter.com/hotpizzas



github.com/ryanhagerty/eth-react

**THANK
YOU!**