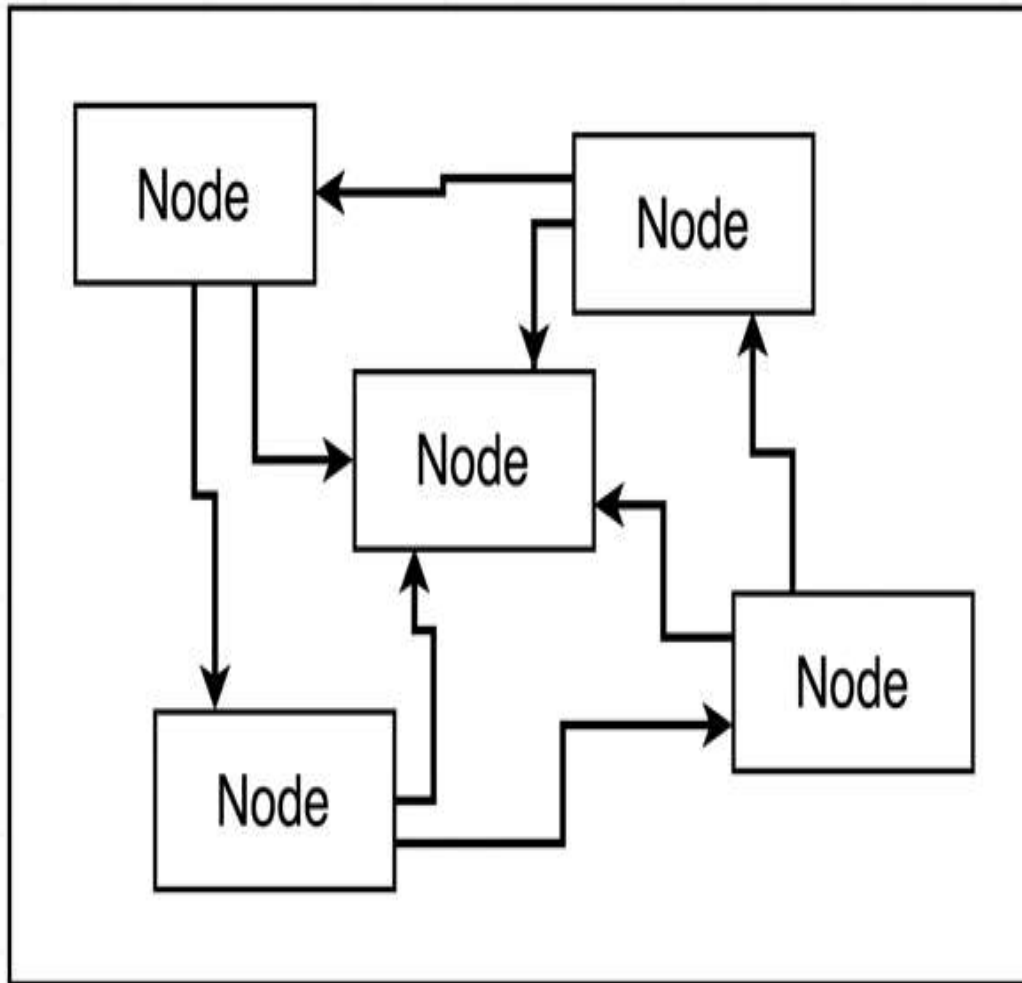




ethereum

An Ethereum Network



Ethereum networks are used to transfer money and store data

There are many different Ethereum networks.

Networks are formed by one or more nodes.

Each node is a machine running an ethereum client.

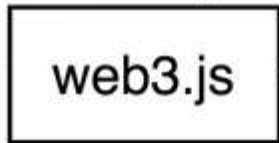
Anyone can run a node.

Each node can contain a full copy of the blockchain

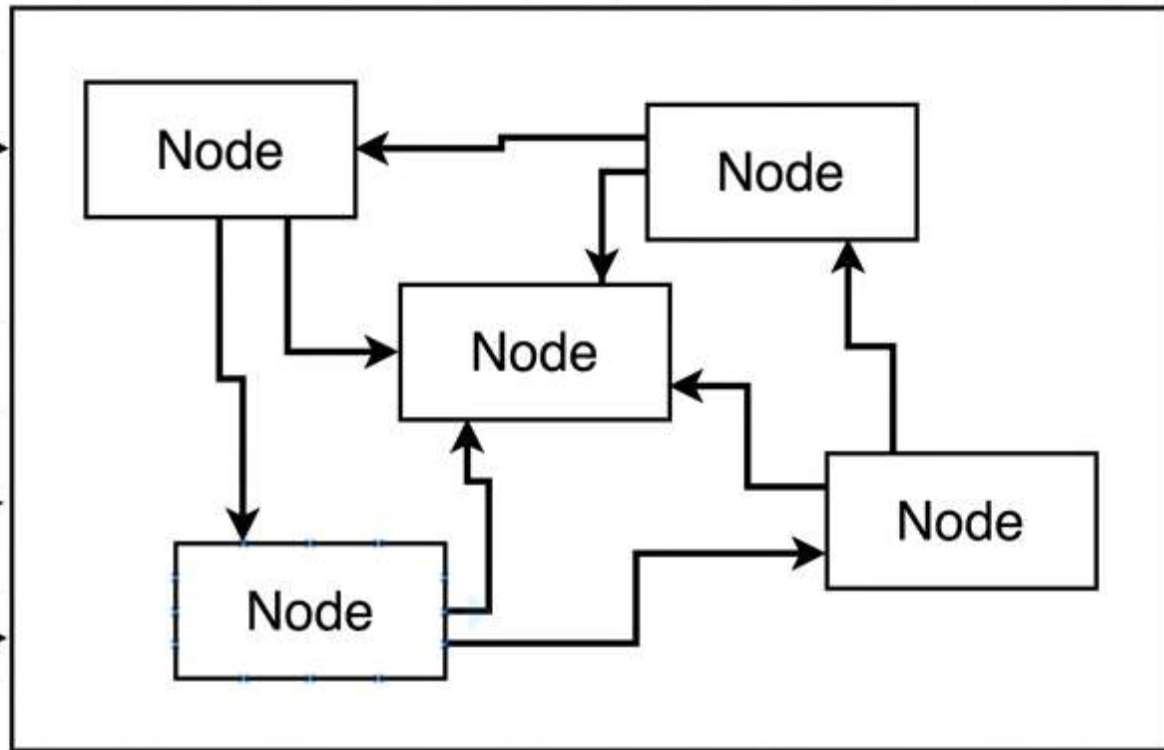
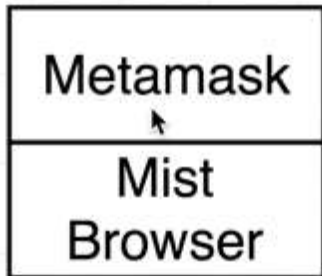
The 'blockchain' is a database that stores a record of every transaction that has ever taken place

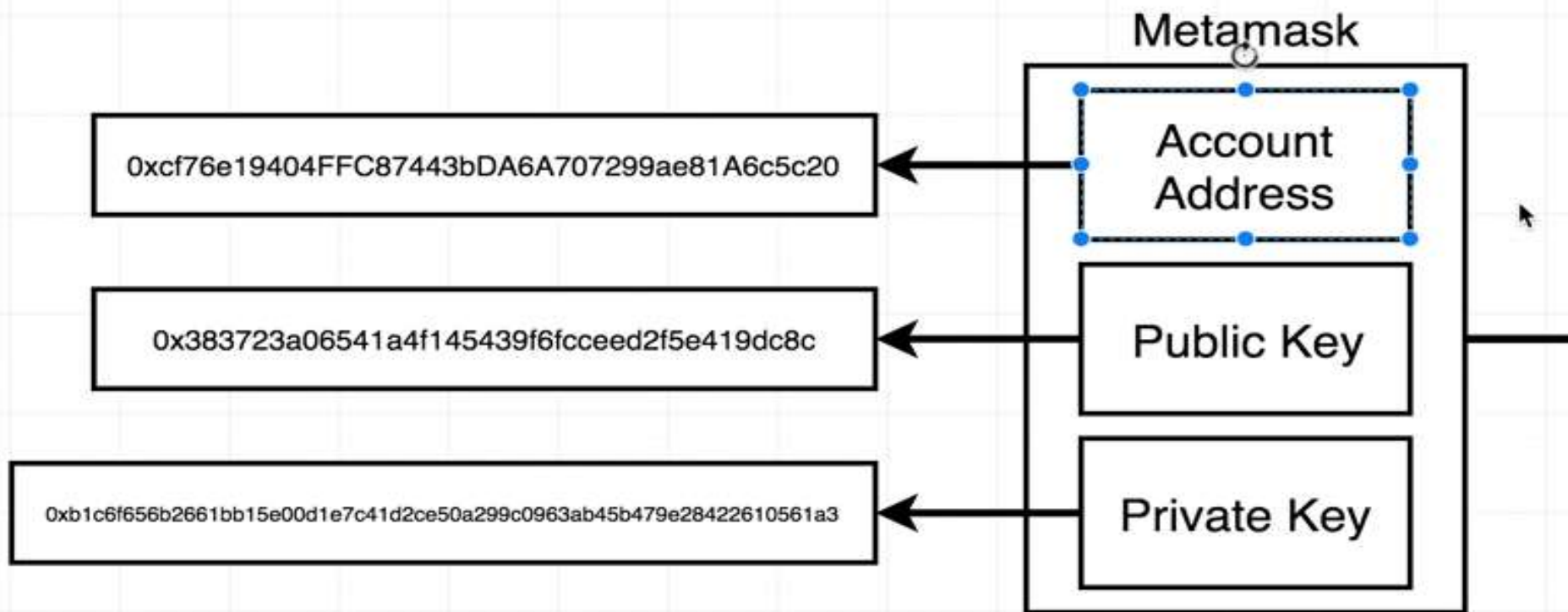
Ropsten Network, Kovan Network, Rinkeby Test Network, Localhost

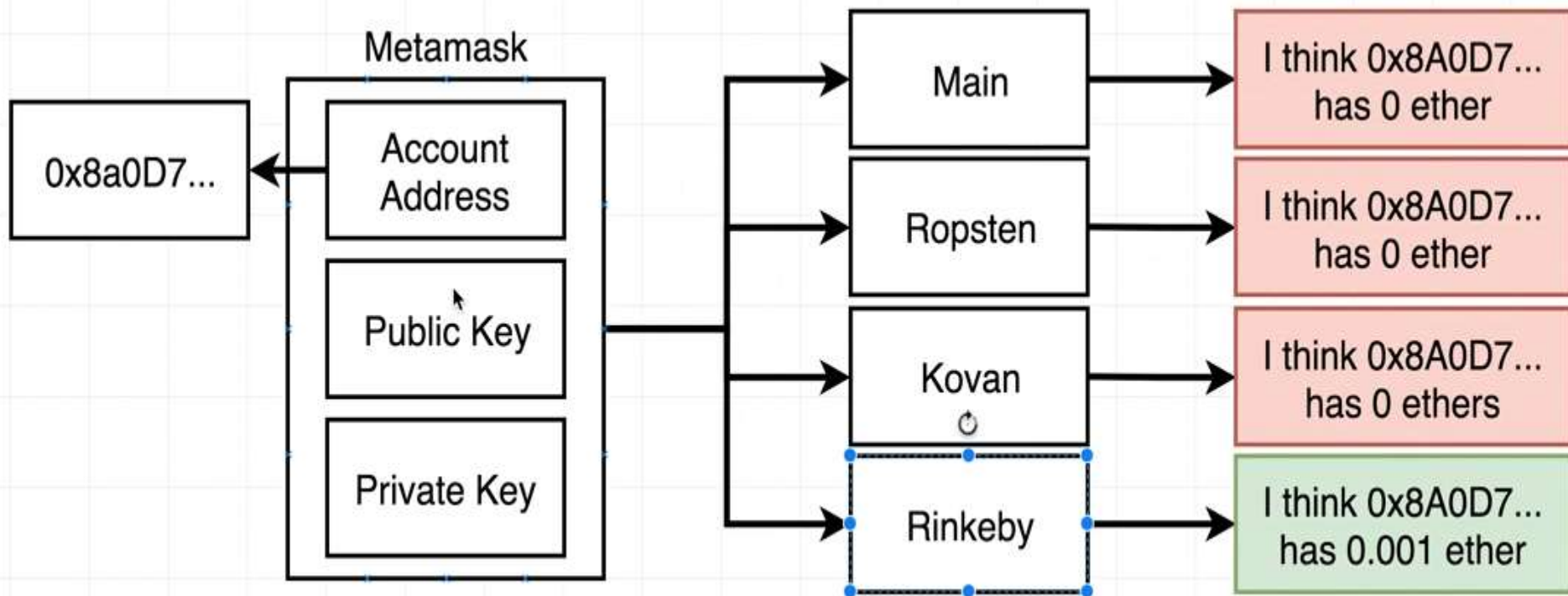
For Developers

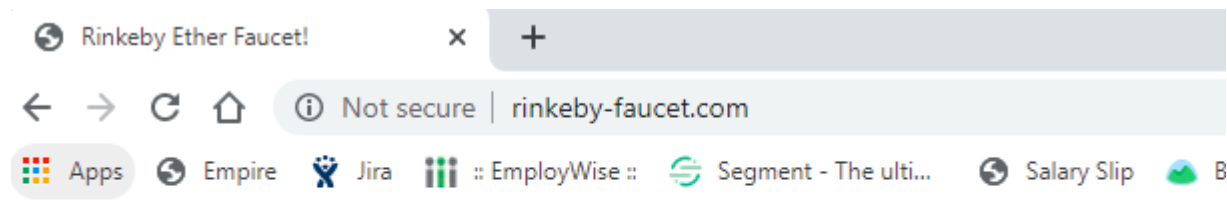


For Consumers









Rinkeby Ether Faucet

Give me your address and I'll give you .001 ether!

My Address:

<https://rinkeby-faucet.com/>

Rinkeby Ether Faucet

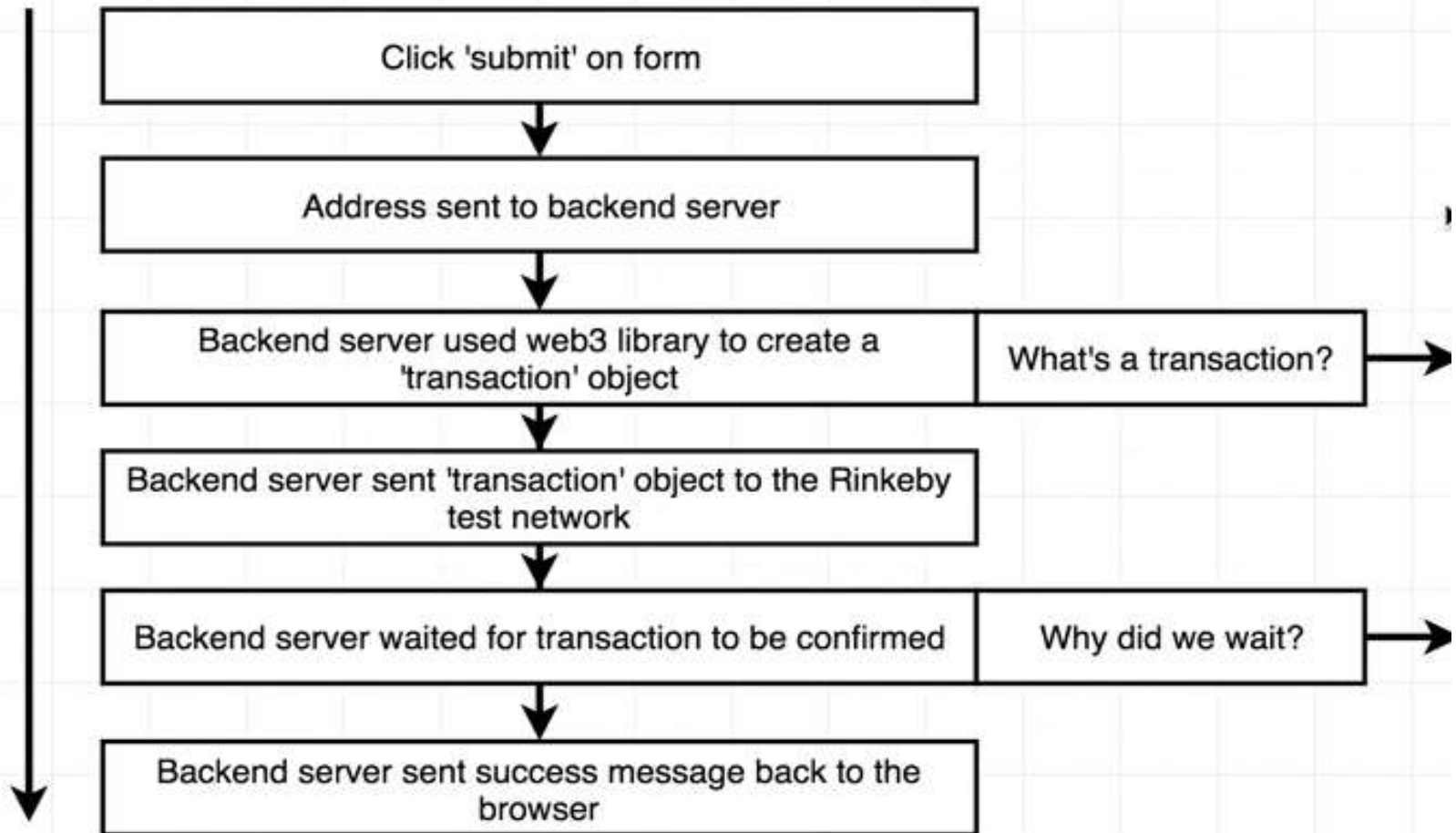
Give me your address and I'll give you .001 ether!

My Address:

Great, coins are on the way!

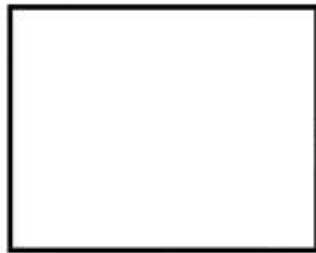
If you're curious, here is your transaction id: 0xc36ba4807b8f5e2f593fdc2213dfe5cc7b0f864d1b69ddae0389e62b1b10087e

Time



**Target block time = 15
seconds**

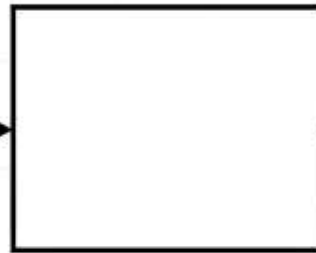
Block #100



Find a hash
less than
1000

↓
20 seconds

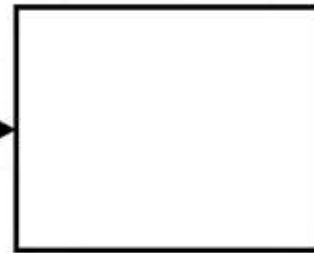
Block #102



× × × ×
× Find a hash ×
× less than ×
× 10,000 ×
× ×

↓
5 seconds

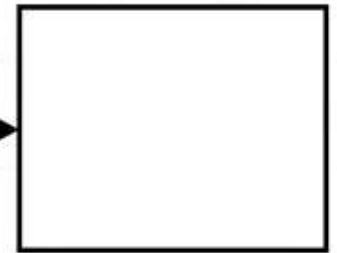
Block #103



Find a hash
less than
5,000

↓
17 seconds

Block #104



Find a hash
less than
4,000

↓
15 seconds

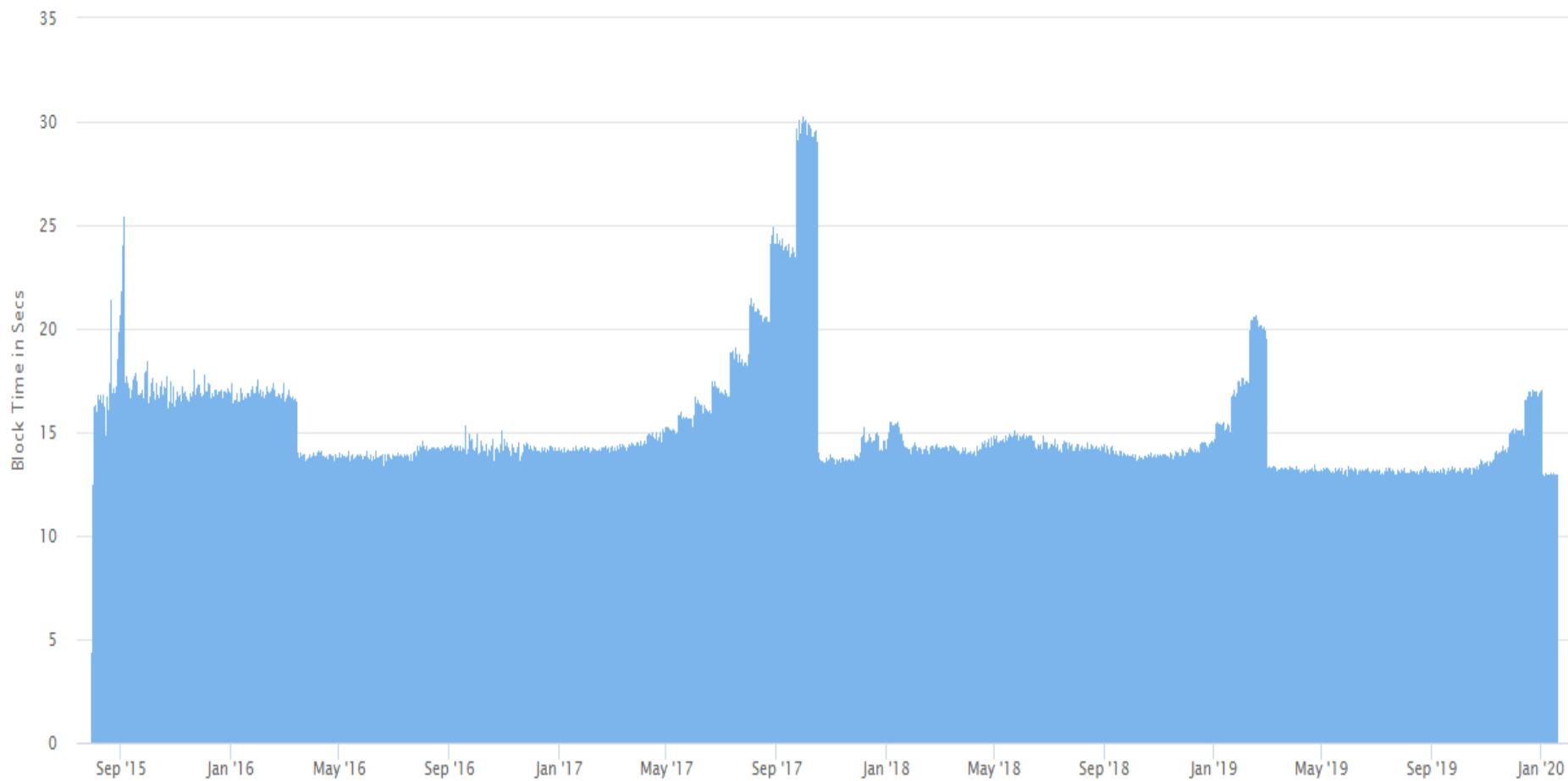


Ethereum Average Block Time Chart



Source: Etherscan.io

Click and drag in the plot area to zoom in



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.

seven awake weekend skin garden
insane camera achieve orient
grain section allow

Remind me later

Next

Tips:

Store this phrase in a password manager like 1Password.

Write this phrase on a piece of paper and store in a secure location. If you want even more security, write it down on multiple pieces of paper and store each in 2 - 3 different locations.

Memorize this phrase.

Download this Secret Backup Phrase and keep it stored safely on an external encrypted hard drive or storage medium.

<https://www.trufflesuite.com/ganache>

<https://chrome.google.com/webstore/detail/metamask/nkbihfbeogaeaoehlefnkodbefgpgknn/rela>



METAMASK

Main Ethereum Network



Account 1

Details

0xBBbc...EE6b



0 ETH
\$0.00 USD

Don't see your tokens?

Click on Add Token to add them to
your account

Add Token



0 ETH
\$0.00 USD

Deposit

Send

History

You have no transactions



METAMASK

Main Ethereum Network



Account 1

Details

0xBBbc...EE6b



0 ETH
\$0.00 USD

Don't see your tokens?

Click on Add Token to add them to
your account

Add Token



0 ETH
\$0.00 USD

History

You have no transactions

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



METAMASK

Main Ethereum Network



Account 1

Details

0xBBbc...EE6b



0 ETH



0 ETH
\$0.00 USD

Deposit

Send

History

You have no transactions

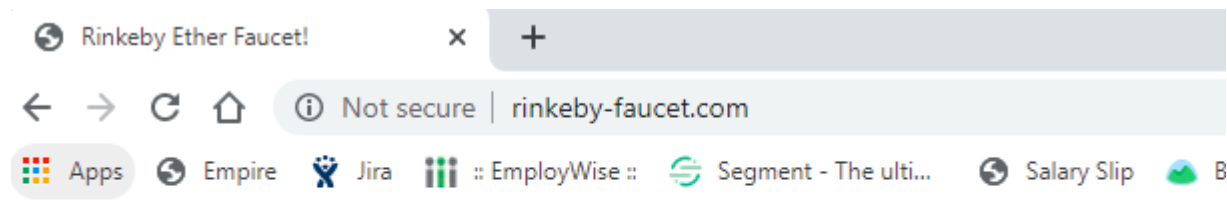
Elements Console Sources Network Performance Memory Application Security Audits

top Filter Default levels

Setting up Sentry Remote Error Reporting: SENTRY_DSN_PROD

0xBBbcd68918819d58887ebC428b1120A70d1EE6b

1.0717925029220792e+48



Rinkeby Ether Faucet

Give me your address and I'll give you .001 ether!

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Rinkeby Ether Faucet

Give me your address and I'll give you .001 ether!

My Address:

Great, coins are on the way!

If you're curious, here is your transaction id: 0xc36ba4807b8f5e2f593fdc2213dfe5cc7b0f864d1b69ddae0389e62b1b10087e



METAMASK



Rinkeby Test Network



Account 1

Details

0xBBbc...EE6b



0.001 ETH



0.001 ETH

Deposit

Send

History



Deposit

1/20/2020 at 15:47

CONFIRMED

0.001 ETH

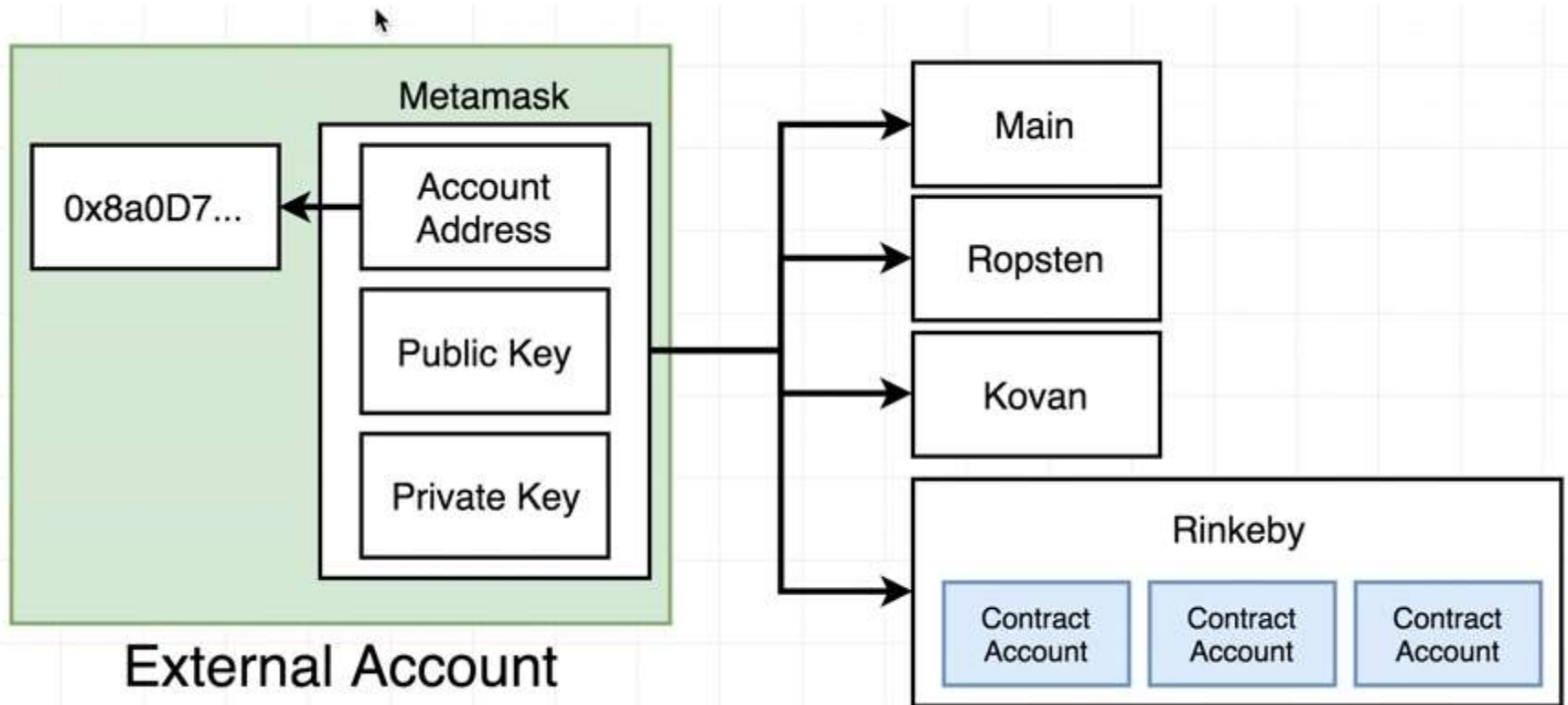
Smart Contract

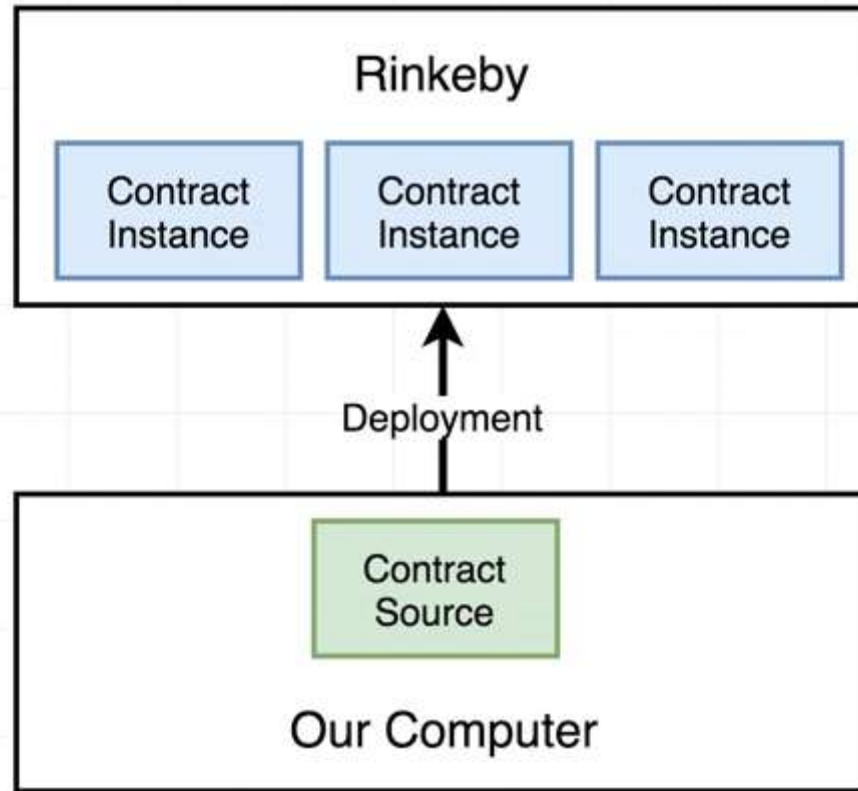


```
graph TD; A[Smart Contract] --> B[An account controlled by code];
```

An account controlled
by code

Contract Account	
Field	Description
balance	Amount of ether this account owns
storage	Data storage for this contract
code	Raw machine code for this contract





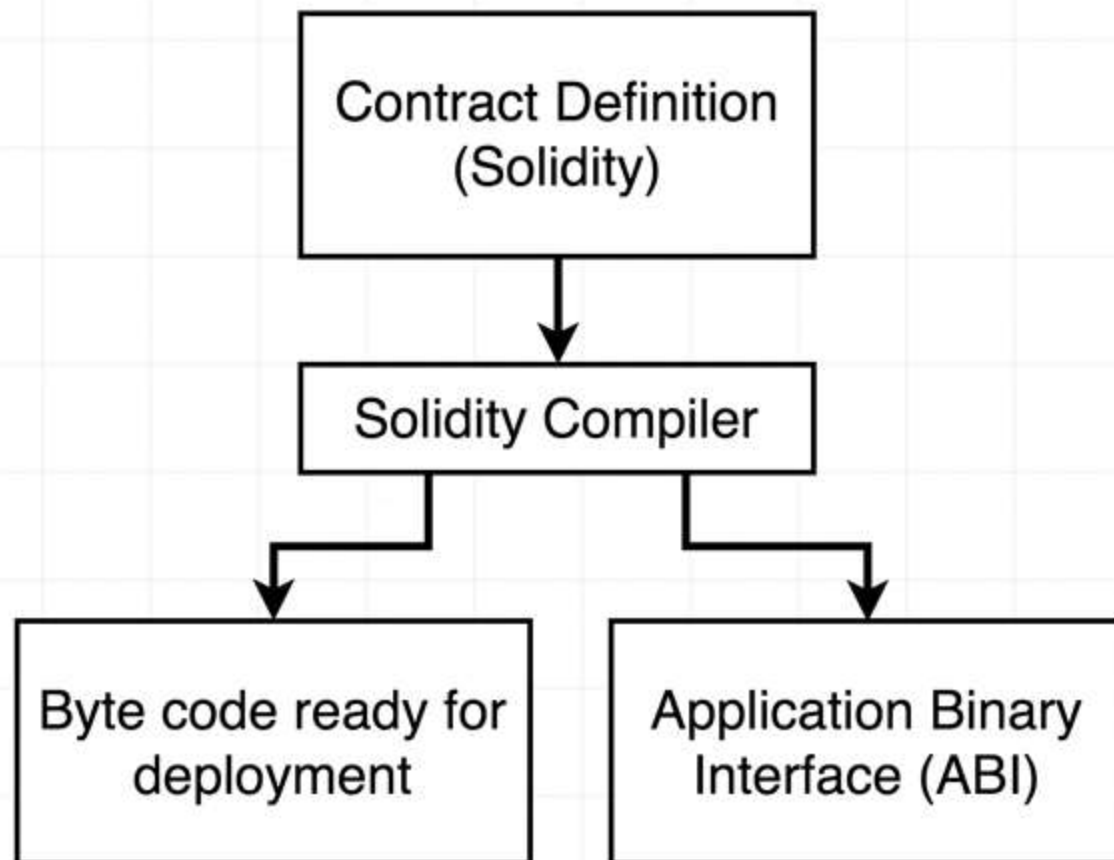
Solidity Programming Language

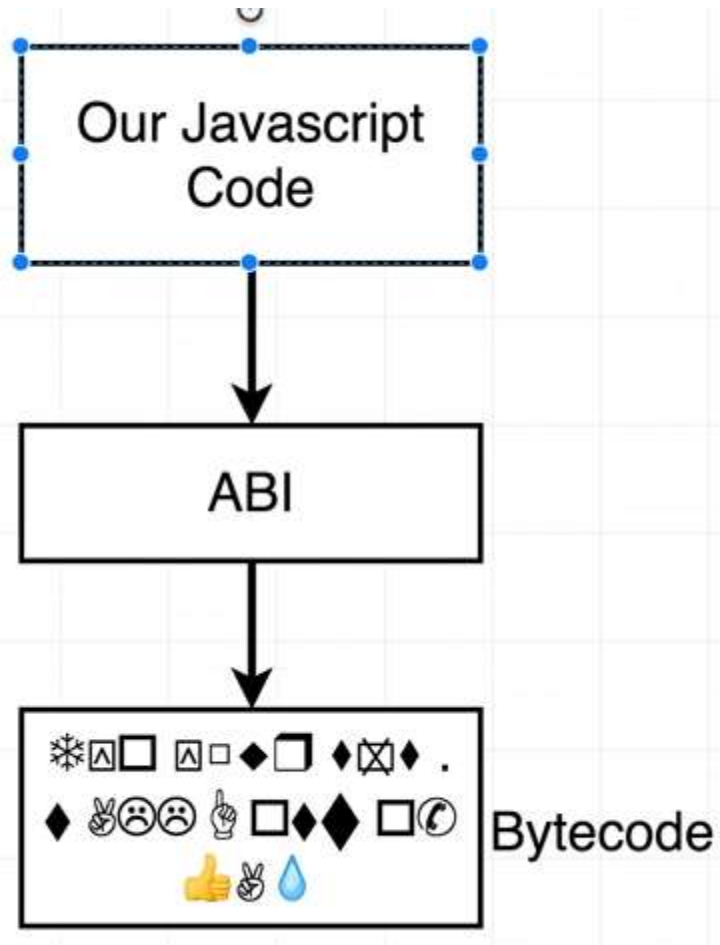
Written in .sol files

Strongly typed

Similar to Javascript

Has several huge, gigantic 'gotchas'





REMIX.ETHEREUM.ORG

The screenshot displays the Remix IDE interface. The main editor shows a Solidity contract named `test3` with the following code:

```
1 import "remix_tests.sol"; // this import is automatically injected by Remix.
2 import "./ballot.sol";
3
4
5 contract test3 {
6
7     Ballot ballotToTest;
8     function beforeAll () public {
9         ballotToTest = new Ballot(2);
10    }
11
12    function checkWinningProposal () public {
13        ballotToTest.vote(1);
14        Assert.equal(ballotToTest.winningProposal(), uint(1), "1 should be the winning proposal");
15    }
16
17    function checkWinningProposalWithReturnValue () public view returns (bool) {
18        return ballotToTest.winningProposal() == 1;
19    }
20 }
21
```

The right sidebar contains the compiler settings and output panels. The top panel shows the current compiler version as `version:0.5.12+commit.7709ece9.Emscripten.dlang` and a dropdown to select a new version. Below this are checkboxes for `Auto compile`, `Enable Optimization`, and `Hide warnings`, along with a `Start to compile (Ctrl-S)` button. The middle panel shows the selected contract `Ballot` and buttons for `Details`, `ABI`, and `Bytecode`. The bottom panel shows a message: `Static Analysis raised 28 warning(s) that requires your attention. Click here to show the warning(s).`

The bottom terminal area displays the following text:

You can use this terminal for:

- Checking transactions details and start debugging.
- Running JavaScript scripts. The following libraries are accessible:
 - [web3 version 1.0.0](#)
 - [ethers.js](#)
 - [swarmjs](#)
 - [compilers](#) - contains currently loaded compiler
- Executing common command to interact with the Remix interface (see list of commands above). Note that these commands can also be included and run from a JavaScript script.
- Use `exports.register(key, obj)/.remove(key)/.clear()` to register and reuse object across script executions.

Two warning messages are visible in the bottom right corner:

- `remix_tests.sol:2:1: Warning: Source file does not import library Assert {`
`^ (Relevant source part starts here and spans across`
- `browser/ballot_test.sol:2:1: Warning: Source file does not import "remix_tests.sol"; // this import is automatic`
`^ (Relevant source part starts here and spans across`

First contract

```
pragma solidity ^0.4.17;
```

```
contract Inbox {  
    string public message;
```

```
    function Inbox(string initialMessage) public {  
        message = initialMessage;  
    }
```

```
    function setMessage(string newMessage) public {  
        message = newMessage;  
    }
```

```
    function getMessage() public view returns (string) {  
        return message;  
    }  
}
```


Function
name

Function
type

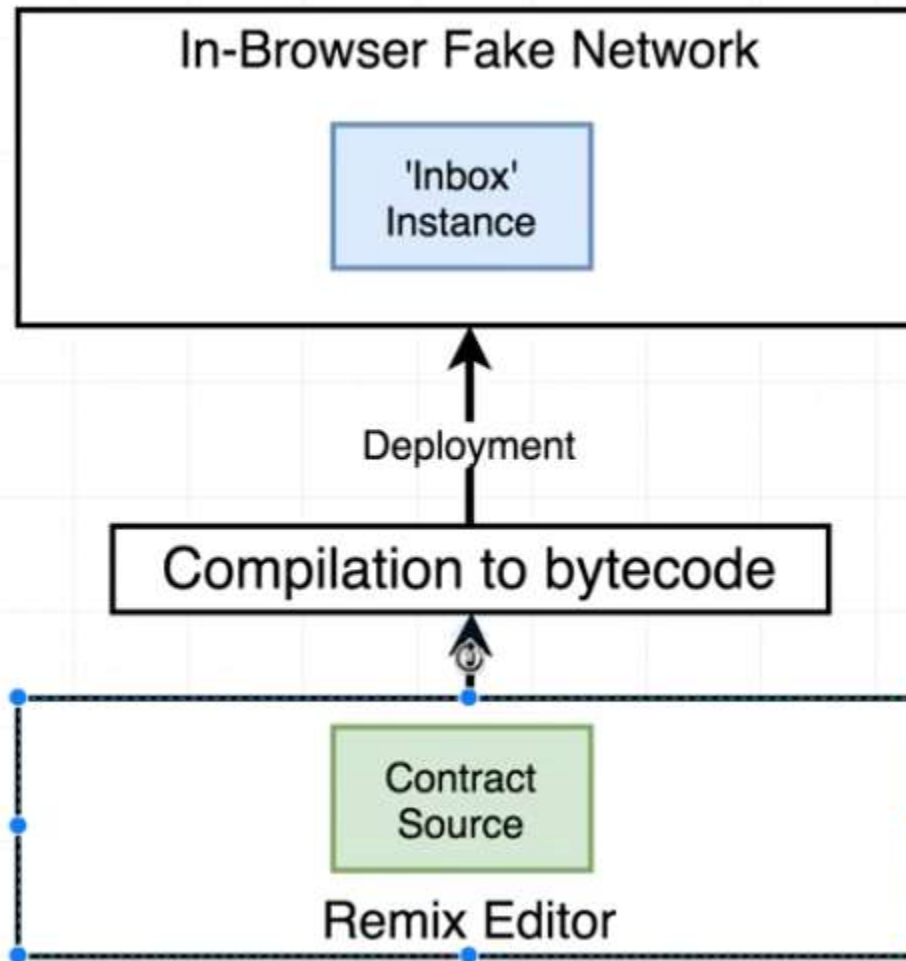
Return types

```
function getMessage() public view returns (string) {  
    return message;  
}
```

Function Types

Common Function Types	
Can only use one per function	public Anyone can call this function
	private Only this contract can call this function.
They mean the same thing	view This function returns data and does <i>not</i> modify the contract's data
	constant This function returns data and does <i>not</i> modify the contract's data
	pure Function will not modify or even <i>read</i> the contract's data
	payable When someone call this function they might send ether along

What will remix do



Compiling contract

» + . " .. . x

ContractDefinition Inbox 0 reference(s)

```
1 pragma solidity ^0.4.17;
2
3 contract Inbox {
4     string public message;
5
6     function Inbox(string initialMessage) public {
7         message = initialMessage;
8     }
9
10    function setMessage(string newMessage) public {
11        message = newMessage;
12    }
13
14    function getMessage() public view returns (string) {
15        return message;
16    }
17 }
```

Compile Run Settings Debugger Analysis

Start to compile Auto compile

Inbox

Details

Publish on Swarm

Static Analysis raised 3 warning(s)

Inbox

Settings.....

» + browser/ballot.sol x

» Compile Run Settings Debugger Analysis Support

```
1 pragma solidity ^0.4.17;
2
3 contract Inbox {
4     string public message;
5
6     function Inbox(string initialMessage) public {
7         message = initialMessage;
8     }
9
10    function setMessage(string newMessage) public {
11        message = newMessage;
12    }
13 }
```

[2] only remix transactions, script Search transactions

remix

Environment Injected Web3 Rinkeby (4) i

Account 0x8a0...c3f23 (0.001 ether)

Gas limit 3000000

Value 0 wei

Inbox

string initialMessage Create

Load contract from Address At Address


0 pending transactions

0 contract Instances

More settings...

Compile Run **Settings** Debugger Analysis Support

Environment JavaScript VM  VM (-) 

Account 0xca3...a733c (99.9999999999996323 


Gas limit 3000000


Value 0 wei 

Inbox 



"Hi there!" 

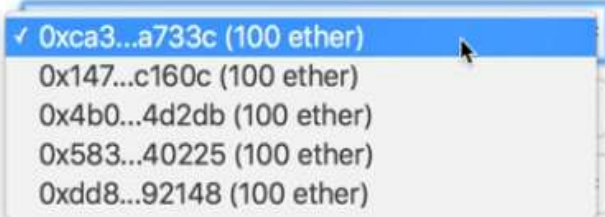
Load contract from Address 

0 pending transactions   

 Inbox at 0x692...77b3a (memory) 


» Compile Run **Settings** Debugger Analysis Support


Environment JavaScript VM  VM (-) 


Account 




Gas limit

Value

Inbox 

string initialMessage 

Load contract from Address 

0 pending transactions   

0 contract Instances

Inbox at 0x692...77b3a (memory)

message

getMessage0: string: Hi there!

setMessagestring newMessage

Inbox at 0x692...77b3a (memory)

message

getMessage0: string: Bye there!

setMessage"Bye there!"

Inbox

"Hi there!"Create

Load contract from AddressAt Address

0 pending transactions

Inbox at 0x692...77b3a (memory)

message

getMessage

setMessagestring newMessage