

expo QPA 25

MADRID
May 20th,
21st & 22nd
2025



expoqa.eu

E2E Tests for Web3 Apps



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About me



azevedorafaela.com



News UK



Agenda

- What is Web3 ?
- What is Blockchain ?
- Web3 Application Infrastructure
- Demo:
 - Setup your Env
 - Run your local Blockchain
 - Run your Dapp
 - Run E2E Test
- Your turn

What are you looking for most in this session?



<https://app.sli.do/event/cQ4PDxTPy13AXtUvZ5vT6z>

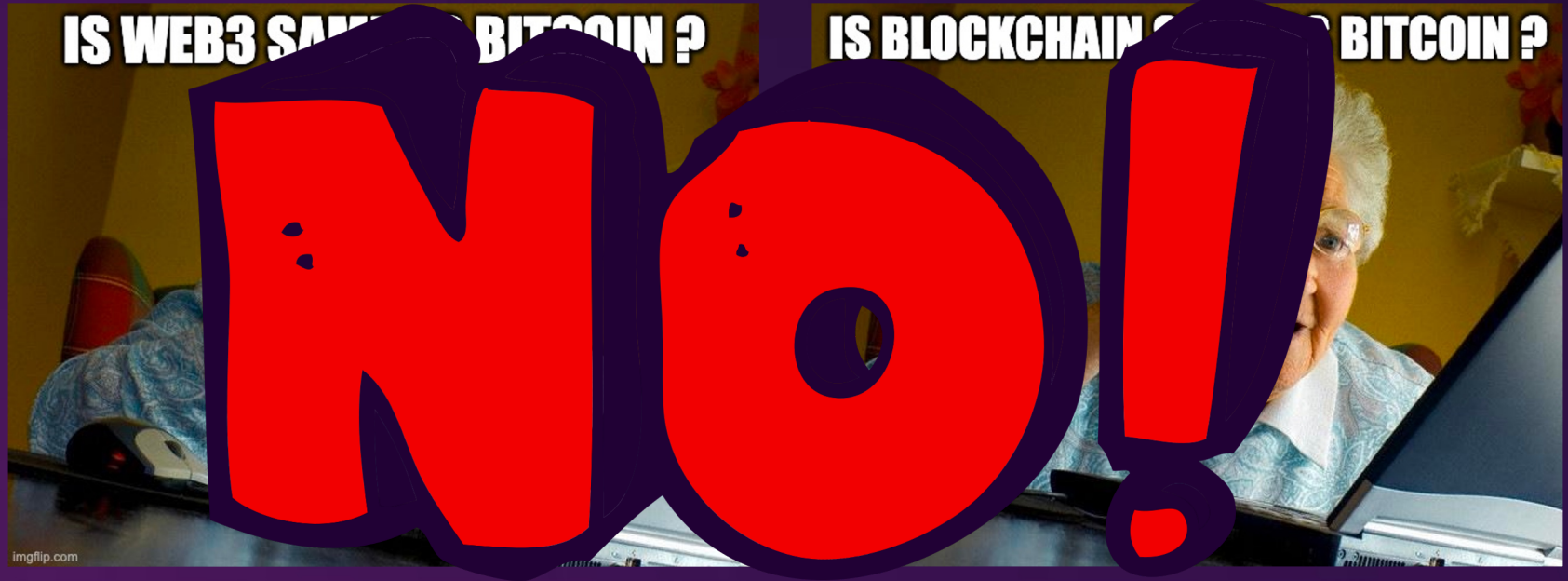
Get the Slides



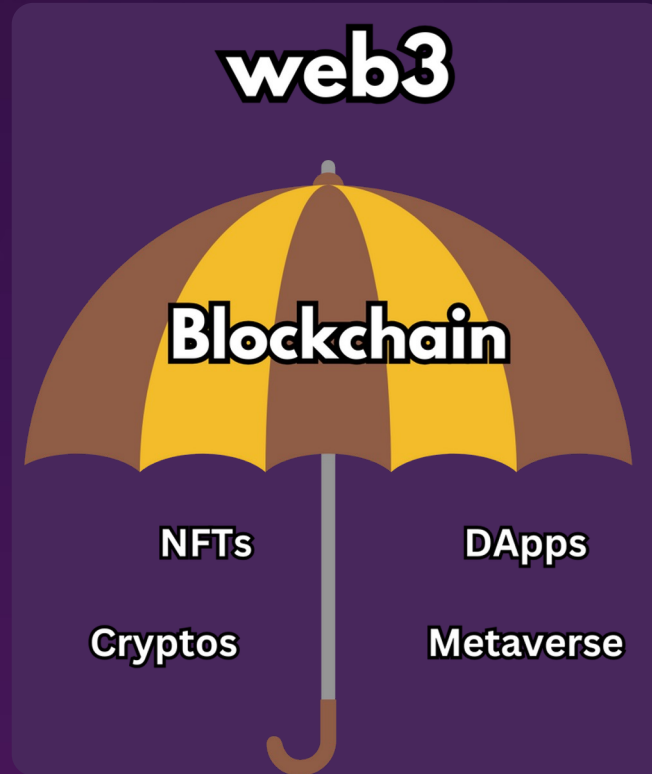
What is Web3 ?



What is Web3 ?



What is Web3 ?



What is Web3 ?

Decentralised online ecosystem
based on blockchain



Welcome to Pinterest

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EdibleArrangements.com

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Disney Wreck-It Ralph

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 Only from AT&T.
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00,000 portfolio.
 guide for retirees written
 by a financial planner and money
 manager at Fisher's firm. It's called
 "The Retirement Plan."
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 your life a little love. It still makes sense to
 give!

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FORRESTER

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Shades of Berries

Average Amazon.com Customer Review
 ★★★★★ (109) 12/13/12

★★★★★ Be
 451 have owned
 running watch
 Suurto and f

amazon.com rewards
\$50 Off Instantly

Mix 100.7

HOLIDAY INTERNET SALE
 NOV 22 - DEC 31

exede SAVE 25% ON

Free at 7:30am

paysmix iHeartRADIO

Download Your Guide!

FISHER INVESTMENTS

- Tampa
- New York



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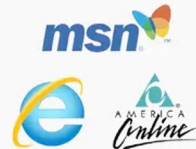
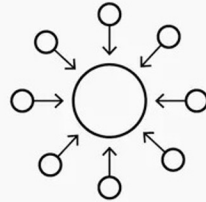
Premium roast coffee

What is Web3 ?



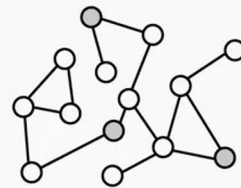
1900s–2000

Static read-only
web pages



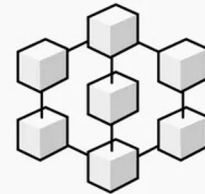
2000s–2020s

Information-centric
and interactive



2020s–?

User-centric,
decentralized, private,
and secure





Provider

EIP 6963

```
{
  "info": {
    "icon": "data:image/png;base64,iVBORw0KGGoAA...",
    "name": "Brave Wallet",
    "rdns": "com.brave.wallet",
    "uuid": "b45eb155-a5d8-4967-8877-4e60e3612ed5"
  },
  "provider": "..."
}
```

USE BRAVE WALLET

```
{
  "info": {
    "uuid": "92d7b755-0eef-4f2a-9...",
    "name": "MetaMask",
    "icon": "data:image/svg+xml;b...",
    "rdns": "io.metamask"
  },
  "provider": "..."
}
```

USE METAMASK

Account 1
0x42Ff2...27Ce0

0.5 SepoliaETH

Buy & Sell Send Swap Bridge Portfolio

Tokens NFTs Activity

SepoliaETH 0.5 SepoliaETH

+ Import tokens

Refresh list

We've updated our privacy policy [Read more](#)

Deef-4f2a-94fa-25eccf41cffc

WINDOW.ETHEREUM

Status

What advantages can you see in using Web3 Apps ?

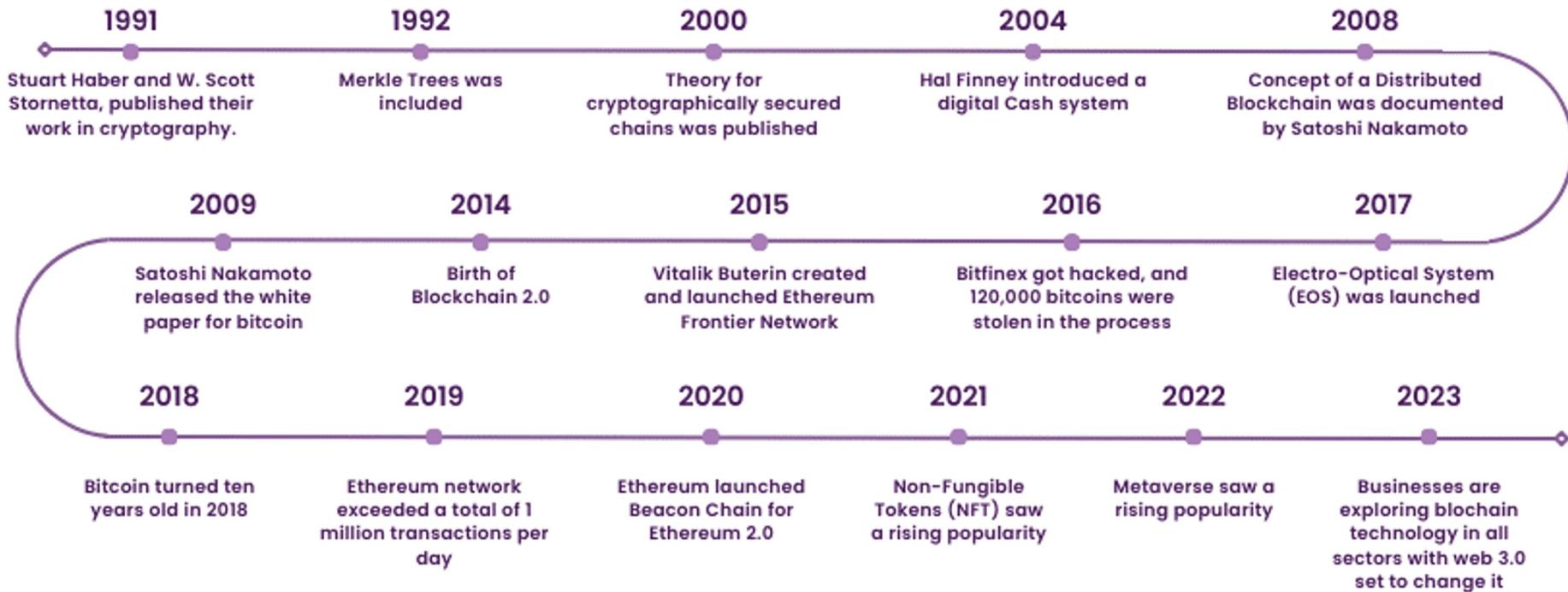


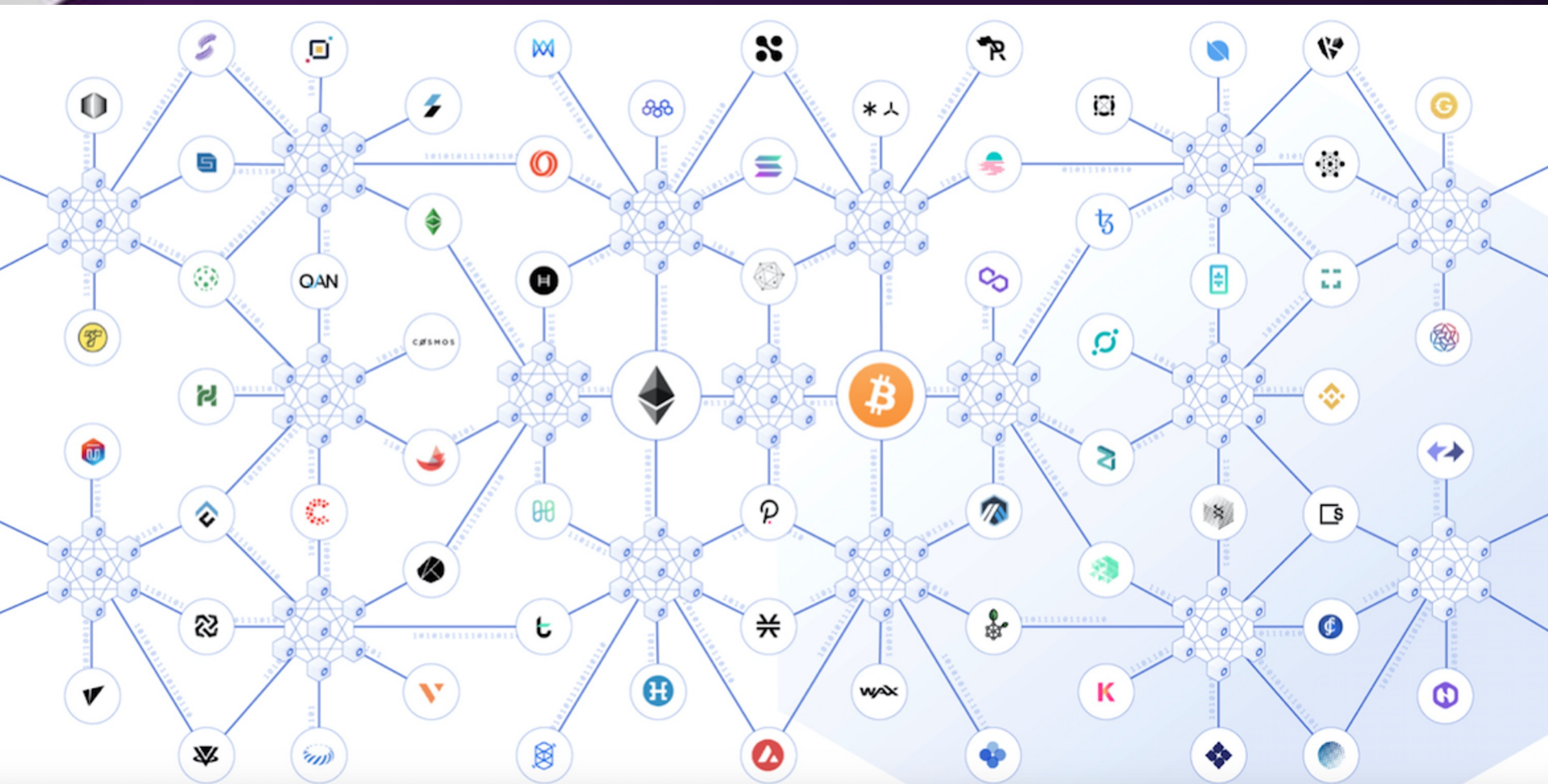
<https://app.sli.do/event/cQ4PDxTPy13AXtUvZ5vT6z>

What is Blockchain ?

Decentralized network of nodes maintaining a shared ledger linking blocks with transactions through cryptography.

Blockchain History Timeline





50+ BLOCKCHAIN REAL WORLD USES CASES

GOVERNMENT

Essentia develops world's first blockchain solution to manage international logistics hub together with Traffic Labs and the Finnish Government

essentia.one

IDENTIFICATION

Voter registration is being facilitated via a blockchain project in Switzerland spearheaded by Uport.

uport

MOBILE PAYMENTS

The blockchain ledger that Ripple uses has been latched onto by a group of Japanese banks, who will be using it for quick mobile payments.

ripple

INSURANCE

A smart contract-based blockchain is being used by Insurer American International Group Inc as a means of saving costs and increasing transparency.

AIG

ENDANGERED SPECIES PROTECTION

The protection of endangered species is being facilitated via a blockchain project that records the activities of these rare animals.

CARBON OFFSETS

IBM is using the Hyperledger Fabric blockchain in China to monitor carbon offset trading.

IBM HYPERLEDGER

ENTERPRISE

Ethereum's blockchain can be accessed as a cloud-based service courtesy of Microsoft Azure.

Microsoft Azure

BORDER CONTROL

Essentia has devised a border control system that would use blockchain to store passenger data in the Netherlands.

essentia.one

SUPPLY CHAINS

IBM and Walmart have partnered in China to create a blockchain project that will monitor food safety.

IBM Walmart

HEALTHCARE

A number of healthcare systems that store data on the blockchain have been pioneered including MedRec.

MEDREC

SHIPPING

Shipping is a natural fit for blockchain, and Maersk have been trialling a blockchain-based project within the maritime logistics industry.

MAERSK

REAL ESTATE

Blockchain is now being used to complete real estate deals, the first of which was conducted in Kiev by Propy.

PROPY

ENERGY

Essentia is developing a test project that will help energy suppliers track the distribution of their resources in real time, whilst maintaining data confidentiality.

essentia.one

LAND REGISTRY

Land registry titles are now being stored on the blockchain in Georgia in a project developed by the National Agency of Public Registry.

PUBLIC REGISTRY

COMPUTATION

Digital Currency Group are helping Amazon Web Services examine ways in which the distributed ledger technology can help improve database security.

DIGITAL CURRENCY GROUP

ADVERTISING

New York Interactive Advertising Exchange has been experimenting with blockchain as a means of providing an ads marketplace for publishers.

NYIAX

BORDER CONTROL

Essentia is developing a blockchain project for border control that will allow customs agents to record passenger data from an array of inputs and safely store it.

essentia.one

JOURNALISM

Decentralized journalism, as enabled by blockchain technology, has the potential to prevent censorship and increase transparency, as Civil has shown.

CIVIL

WASTE MANAGEMENT

Waltonchain is using RFID technology to store waste management data on the blockchain in China.

ENERGY

Food importation is another industry where blockchain is proving its worth, with Louis Dreyfus Co trialling a soybean importation operation using this technology.

LDC

DIAMONDS

The De Beers Group is using blockchain to track the importation and sale of diamonds.

DE BEERS

FINE ART

By storing certificates of authenticity on the blockchain, it's possible to dramatically reduce art forgeries, as one blockchain project is proving.

NATIONAL SECURITY

For the past two years, the US Department of Homeland Security has been using blockchain to record and safely store data captured from its security cameras.

TOURISM

In a bid to boost its tourism economy, Hawaii is examining ways in which blockchain-based cryptocurrencies can be adopted throughout the US state.

TAXATION

In China, a tax-based initiative is using blockchain to store tax records and electronic invoices led by Miaocai Network.

ENERGY

Chile's National Energy Commission has started using blockchain technology as a way of certifying data pertaining to the country's energy usage as it seeks to update its electrical infrastructure.

CNE COMISION NACIONAL DE ENERGIA

RAILWAYS

Russian rail operator Novotrans is storing inventory data on a blockchain pertaining to repair requests and rolling stock.

HOBOTPAK

ENTERPRISE

Google is building its own blockchain which will be integrated into its cloud-based services, enabling businesses to store data on it, and to request their own white label version developed by Alphabet Inc.

Alphabet

MUSIC

Arbit is a blockchain-based project led by former Guns N Roses drummer Matt Sorum seeking a fairer way to reward musicians for their creative efforts.

arbit

FISHING

Blockchain technology has been used to provide a transparent record of where fish was caught, as a means of ensuring it was legally landed.



MATTEOGIANPETRO ZAGO

Web3 Common Bugs



Reentrancy



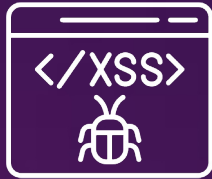
Race Conditions



Denial of
Service
(DDoS)



51% Attacks








Cross-Site Scripting (XSS)

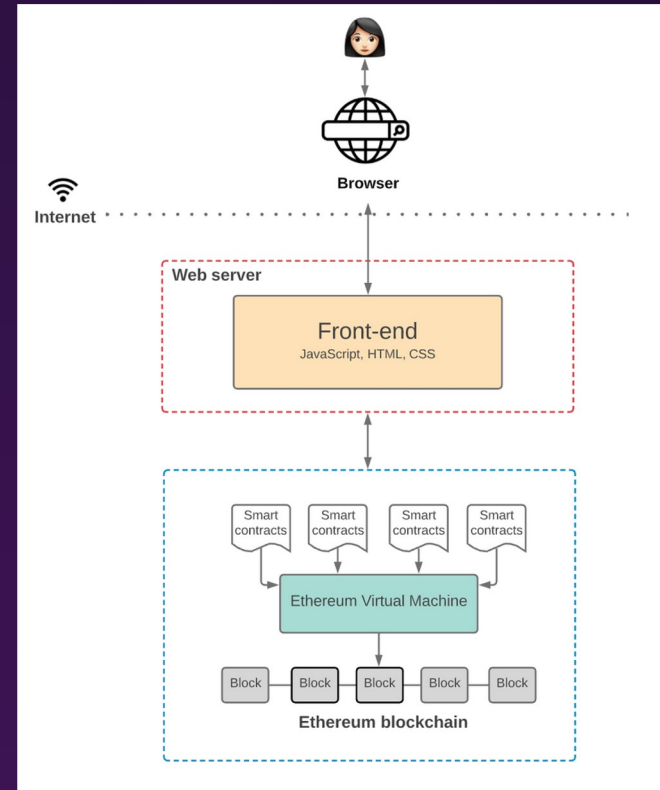
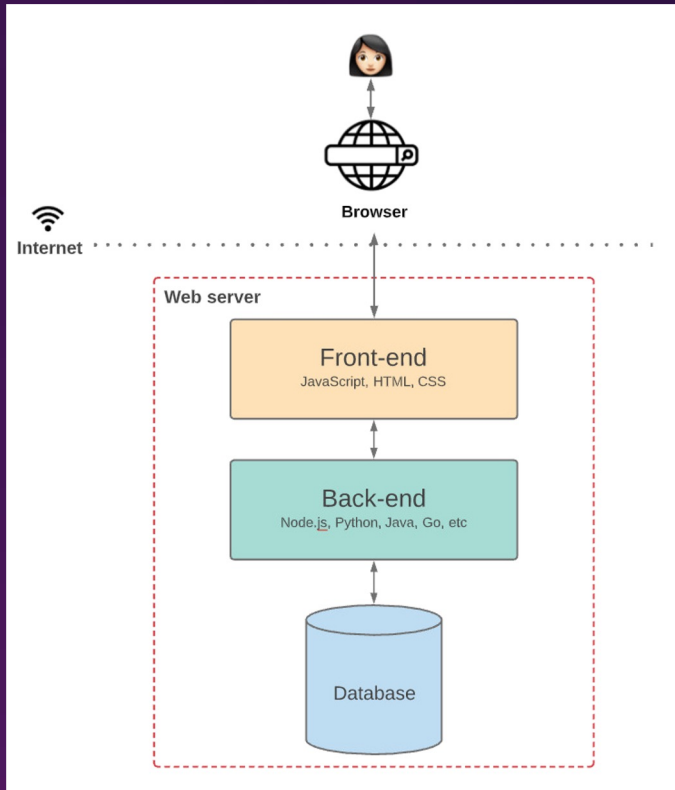


Weak Private Key Management

Blockchain Network Types

	Public	Private	Hybrid	Consortium
 Permissioned/Permissionless	Permissionless	Permissioned	Permissioned & Permissionless	Permissioned
 Control	No control by a central authority	Control by a central authority	Control by a central authority	Control by multiple central authorities
 Main Advantages	<ul style="list-style-type: none">✓ Independence✓ Transparency	<ul style="list-style-type: none">✓ Performance✓ Scalability	<ul style="list-style-type: none">✓ Performance✓ Low Cost	<ul style="list-style-type: none">✓ Performance✓ Security
 Main Disadvantages	<ul style="list-style-type: none">✗ Performance✗ Scalability Issues	<ul style="list-style-type: none">✗ Security✗ Trust	<ul style="list-style-type: none">✗ Transparency✗ Upgrading	<ul style="list-style-type: none">✗ Transparency
 Examples	Bitcoin Litecoin	Hyperledger Fabric	XRP token	Corda Quorum

INFRASTRUCTURE



Smart Contract

Contains the terms, rules, and conditions
of agreements & transactions

GAS FEE

Unit of measure for how much computational work is required to process transactions and smart contracts.

Scenarios Examples

Account Information

- Request Account Access
- Get Current Accounts
- Account Change Event

Network Information

- Change to another Network

Sending Transactions

- Send Token Transaction
- Send Ether Transaction



Scenarios Examples

Signature Requests

- Message Signing
- Typed Data Signing (EIP-712)

Smart Contract Interactions & Blockchain Provider Events

- Contract Call
- Network Changes

Error Handling

- Network or Account Access Denial
- Failed Transactions



Scenarios Examples

Gas Fees and Customization

- Estimate Gas
- Set Gas Price and Gas Limit

Handling Permissions

- Requesting Permissions

Security and Privacy

- Detect Metamask Installation
- User Denies Access



Environments



Local



Devnet/Testnet



Mainnet

Ethereum Test Faucets



Sepolia



Holesky



Goerli

Sepolia

- Easy to sync
- Minimal disk space to run a node.
- Uncapped token supply.
- Best place to test smart contracts and dApps.

Holesky

- Over 1.5 million validators running on the testnet.
- Capped supply of hoETH at 1.6 billion, more than twice the amount issued on Goerli.
- Test validators and staking

Demo

A close-up photograph of a man with curly hair wearing a headset. He has a look of intense concentration or stress, with sweat dripping down his face. He is wearing a light-colored, short-sleeved button-down shirt. The background is dark and out of focus, suggesting an office or control room environment.

Time!

```
rafaelasouza@Rafaelas-MacBook-Pro:~/workspace/web3-tests-workshop
anvil (anvil) %1 pnpm (node) %2 ..ests-workshop (-zsh) %3 +

✓ 1 [chromium] > 00_mock.spec.ts:15:1 > should add new account using MetaMask mock (1.5s)
✓ 2 [chromium] > 00_mock.spec.ts:7:1 > should mock MetaMask in the Test Dapp (1.4s)
✓ 3 [chromium] > 01_basic.spec.ts:8:1 > should connect wallet to the MetaMask Test Dapp (10.3s)
✓ 4 [chromium] > 02_simple.spec.ts:7:1 > should confirm contract deployment (13.9s)

4 passed (16.3s)
web3-tests-workshop git:(main) x cd ..
workspace git clone git@github.com:srperf/perfworkshop.git
Cloning into 'perfworkshop'...
remote: Enumerating objects: 246, done.
remote: Counting objects: 100% (246/246), done.
remote: Compressing objects: 100% (179/179), done.
remote: Total 246 (delta 85), reused 188 (delta 48), pack-reused 0 (from 0)
receiving objects: 100% (246/246), 48.56 KiB | 534.00 KiB/s, done.
resolving deltas: 100% (85/85), done.
workspace cd web3-tests-workshop
web3-tests-workshop git:(main) x pnpm run test

web3-tests-workshop@2.0.0 test /Users/rafaelasouza/workspace/web3-tests-workshop
playwright test

Running 4 tests using 4 workers

✓ 1 [chromium] > 00_mock.spec.ts:7:1 > should mock MetaMask in the Test Dapp (1.4s)
✓ 2 [chromium] > 00_mock.spec.ts:15:1 > should add new account using MetaMask mock (1.4s)
✓ 3 [chromium] > 01_basic.spec.ts:8:1 > should connect wallet to the MetaMask Test Dapp (10.8s)
✓ 4 [chromium] > 02_simple.spec.ts:7:1 > should confirm contract deployment (14.9s)

4 passed (21.7s)
web3-tests-workshop git:(main) x cd web3-tests-workshop
```

Your turn !!!

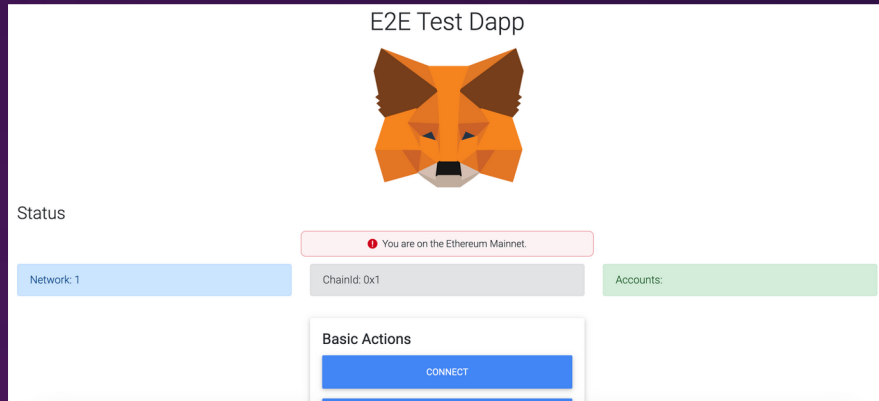


Set up Your Environment



<https://linktr.ee/web3resources>

Explore the Dapp



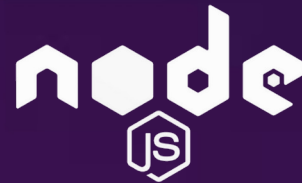
<https://metamask.github.io/test-dapp/>

Prerequisite

- Programming Language: Javascript/Typescript
- Tools: Synpress, Playwright, Metamask, NodeJS, Foundry (Anvil)



MetaMask



Set Up Your Environment

<https://nodejs.org/en/download>

/

<https://github.com/Synthetixio/synpres>

<https://playwright.dev>

/



<https://metamask.io/download>
/



[https://github.com/foundry-
rs/foundry](https://github.com/foundry-rs/foundry)

Set Up



<https://github.com/thechaincademy/web3-tests-workshop/tree/setup>

Set Up your Environment

1. `git clone git@github.com:thechaincademy/web3-tests-workshop`
2. `pnpm install`

Set Up your Environment

3. `curl -L https://foundry.paradigm.xyz | bash`
4. Update the new configs on your terminal. Eg.:
`source /Users/user/.zshenv`
5. `foundryup`

Set Up your Environment

6. anvil

- (0) 0xac0974bec39a17e36ba4a6b4d238ff944bacb478cbed5efcae784d7bf4f2ff80
- (1) 0x59c6995e998f97a5a0044966f0945389dc9e86dae88c7a8412f4603b6b78690d
- (2) 0x5de4111afa1a4b94908f83103eb1f1706367c2e68ca870fc3fb9a804cdab365a
- (3) 0x7c852118294e51e653712a81e05800f419141751be58f605c371e15141b007a6
- (4) 0x47e179ec197488593b187f80a00eb0da91f1b9d0b13f8733639f19c30a34926a
- (5) 0x8b3a350cf5c34c9194ca85829a2df0ec3153be0318b5e2d3348e872092edffba
- (6) 0x92db14e403b83dfe3df233f83dfa3a0d7096f21ca9b0d6d6b8d88b2b4ec1564e
- (7) 0x4bbb85ce3377467afe5d46f804f221813b2bb87f24d81f60f1fcdcf7cbf4356
- (8) 0xdbda1821b80551c9d65939329250298aa3472ba22fee921c0cf5d620ea67b97
- (9) 0x2a871d0798f97d79848a013d4936a73bf4cc922c825d33c1cf7073dff6d409c6

Wallet

Mnemonic: test test test test test test test test test test junk
Derivation path: m/44'/60'/0'/0/

Chain ID

31337

Base Fee

1000000000

Gas Limit

30000000

Genesis Timestamp

1715723541

Listening on 127.0.0.1:8545

Set Up your Environment

```
7. SEED_PHRASE="test test test test test test test test test test test test junk"  
   WALLET_PASSWORD="Web3TestsWorkshop***"
```

Run your Dapp

8. `pnpm run serve:test-dapp`

→ new-dawn npm run serve:test-dapp

```
> example-new-dawn@0.0.1-alpha.7 serve:test-dapp
> serve node_modules/@metamask/test-dapp/dist -p 9999
```

UPDATE The latest version of `serve` is 14.2.3

Serving!

- Local: http://localhost:9999
- Network: http://192.168.0.127:9999

Copied local address to clipboard!

```
HTTP 14/05/2024 22:28:30 ::1 GET /
HTTP 14/05/2024 22:28:30 ::1 Returned 304 in 203 ms
HTTP 14/05/2024 22:28:31 ::1 GET /warning.svg
HTTP 14/05/2024 22:28:31 ::1 Returned 304 in 5 ms
HTTP 14/05/2024 22:28:31 ::1 GET /metamask-fox.svg
HTTP 14/05/2024 22:28:31 ::1 GET /index.css
HTTP 14/05/2024 22:28:31 ::1 Returned 304 in 3 ms
HTTP 14/05/2024 22:28:31 ::1 Returned 304 in 3 ms
HTTP 14/05/2024 22:28:31 ::1 GET /main.js
HTTP 14/05/2024 22:28:31 ::1 GET /alert-red.svg
HTTP 14/05/2024 22:28:31 ::1 Returned 304 in 2 ms
HTTP 14/05/2024 22:28:31 ::1 Returned 304 in 9 ms
HTTP 14/05/2024 22:28:31 ::1 GET /metamask-fox.svg
HTTP 14/05/2024 22:28:31 ::1 Returned 304 in 2 ms
HTTP 14/05/2024 22:30:09 ::1 GET /
HTTP 14/05/2024 22:30:09 ::1 Returned 200 in 53 ms
HTTP 14/05/2024 22:30:09 ::1 GET /index.css
HTTP 14/05/2024 22:30:09 ::1 GET /metamask-fox.svg
HTTP 14/05/2024 22:30:09 ::1 GET /warning.svg
HTTP 14/05/2024 22:30:09 ::1 Returned 200 in 2 ms
HTTP 14/05/2024 22:30:09 ::1 Returned 200 in 2 ms
HTTP 14/05/2024 22:30:09 ::1 Returned 200 in 2 ms
HTTP 14/05/2024 22:30:09 ::1 GET /alert-red.svg
```

E2E Test Dapp



```
ng;base64,iVBORw0KGgoAAAANSUUhEUgAAAGAAAABGCAIAAABT+uBvAAAML0LEQVR4n02cXWc1RXHfz:
",
llet",
6-4c18-83a1-92ed6f176048"
```

USE BRAVE WALLET

```
vg+xml;base64,PHN2ZyB3awR0aD010DA1IGhlaWdodD010DA1IGZpbGw9Im5vbmluIHZpZXdCb3g9Ij,
d-4389-8aaf-52f409f2e3e8",
eb3-wallet"
```

USE EXODUS

```
{
  "info": {
    "uuid": "2bedbb48-1f97-4f19-9741-10afb646592e",
    "name": "MetaMask",
    "icon": "data:image/svg+xml,%3Csvg%20fill%3D%22none%22%20height%3D%2233%22%20viewBox%3D%220%2035%22%20width%3D%2233%22%20xmlns%3D%22http%3A%2F%2Fwww.w3.org%2F2000%2Fsvg%20%2F%22%3E%3Crect%20width%3D%2233%22%20height%3D%2233%22%20fill%3D%22%20%2F%3E%3C%2Fsvg%3E",
    "rdns": "io.metamask"
  },
  "provider": "...
}
```

USE METAMASK


Active Provider

UUID:

Name: window.ethereum

Icon:

USE WINDOW.ETHEREUM

 You are on the Ethereum Mainnet.

ChainId: 0x1

Accounts:

Basic Actions

Run your tests

9. `pnpm build:cache`

10. `pnpm run test`

Final version



<https://github.com/thechaincademy/web3-tests-workshop/releases/tag/v2.0.0>

Review Your Test Results

```
→ web3-tests-workshop git:(main) x pnpm run test
```

```
> web3-tests-workshop@2.0.0 test /Users/rafaelasouza/workspace/web3-tests-workshop  
> playwright test
```

Running 4 tests using 4 workers

- ✓ 1 [chromium] > 00_mock.spec.ts:15:1 > should add new account using MetaMask mock (1.6s)
- ✓ 2 [chromium] > 00_mock.spec.ts:7:1 > should mock MetaMask in the Test Dapp (1.6s)
- ✓ 3 [chromium] > 01_basic.spec.ts:8:1 > should connect wallet to the MetaMask Test Dapp (10.1s)
- ✓ 4 [chromium] > 02_simple.spec.ts:7:1 > should confirm contract deployment (13.7s)

4 passed (17.0s)

```
→ web3-tests-workshop git:(main) x █
```

Take aways

- Flakyness due to wallet dependency
- E2E scope is key
- Web3 evolution speed
- Mock is possible
- Web3 singularities
- Network performance

Web3 Resources



<https://linktr.ee/web3resources>

QUIZ



<https://app.sli.do/event/cQ4PDxTPy13AXtUvZ5vT6z>

Feedback



<https://pmsm8nczpf4.typeform.com/to/pZLQUU2d>



<https://azevedorafaela.com>



<https://thechainacademy.com>



expo Q&A 25

MADRID
May 20th,
21st & 22nd
2025

Thank you for attending

expoqa.eu