
Blockchain-Lab

V0.5

AUSTRIAPRO

Dr. Christian Baumann

Status per 17.1.2019

Inhalt

- Phase 1 „classic“
- Phase 2 „Ethereum“ – smart contracts
- Phase 3 „MultiChain“
- Phase 4 „Blockchain 3.0“

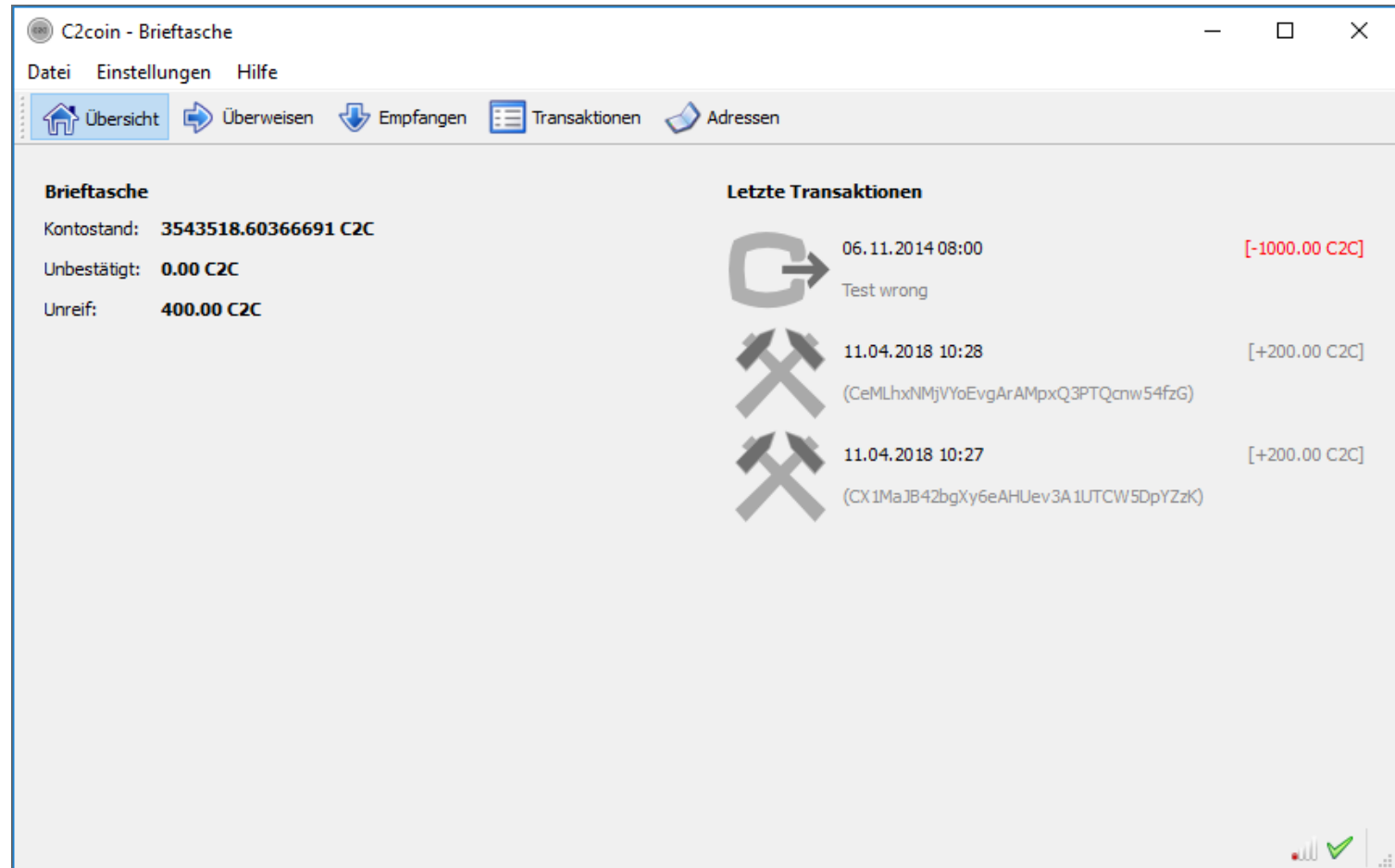
Phase 1

- „classic“ (crypto coin based) blockchains
 - Look & Feel wie Bitcoin, Litecoin ... Client
 - „Hands on“
 - Installation & Betrieb wallet
 - “Werte” transferieren (senden, empfangen)
 - Nachrichten signieren
 - Mining ausprobieren
 - Standalone, CPU, GPU
 - Über Miningpool
 - Weitere Tools kennenlernen
 - Blockexplorer
 - Paper-, Brain-wallets
 - Unterschied „Cryptocurrency – Blockchain“

Classic crypto coin (am Beispiel C2coin)

- Wallet
 - Wallet für Windows:
http://www4.baumann.at/downloads/c2coin_Wallet_Windows-20141107.zip
 - Kurzanleitung dazu:
<http://www4.baumann.at/downloads/C2coin-Readme.txt>
- Mining
 - Mining mit GPUs: <http://www4.baumann.at/downloads/Mining-with-GPUs.txt>
 - Miningportal: <http://coinz.at:81/>
- Tools
 - Faucet (coins senden lassen) <http://coinz.at/c2coin/send.php>
 - Infoseite zum C2coin Netz: <http://coinz.at/c2coin/>
 - Einfacher Blockexplorer: <http://coinz.at/c2coin/be.php>
 - Walletgenerator: <http://coinz.at/walletgenerator/>

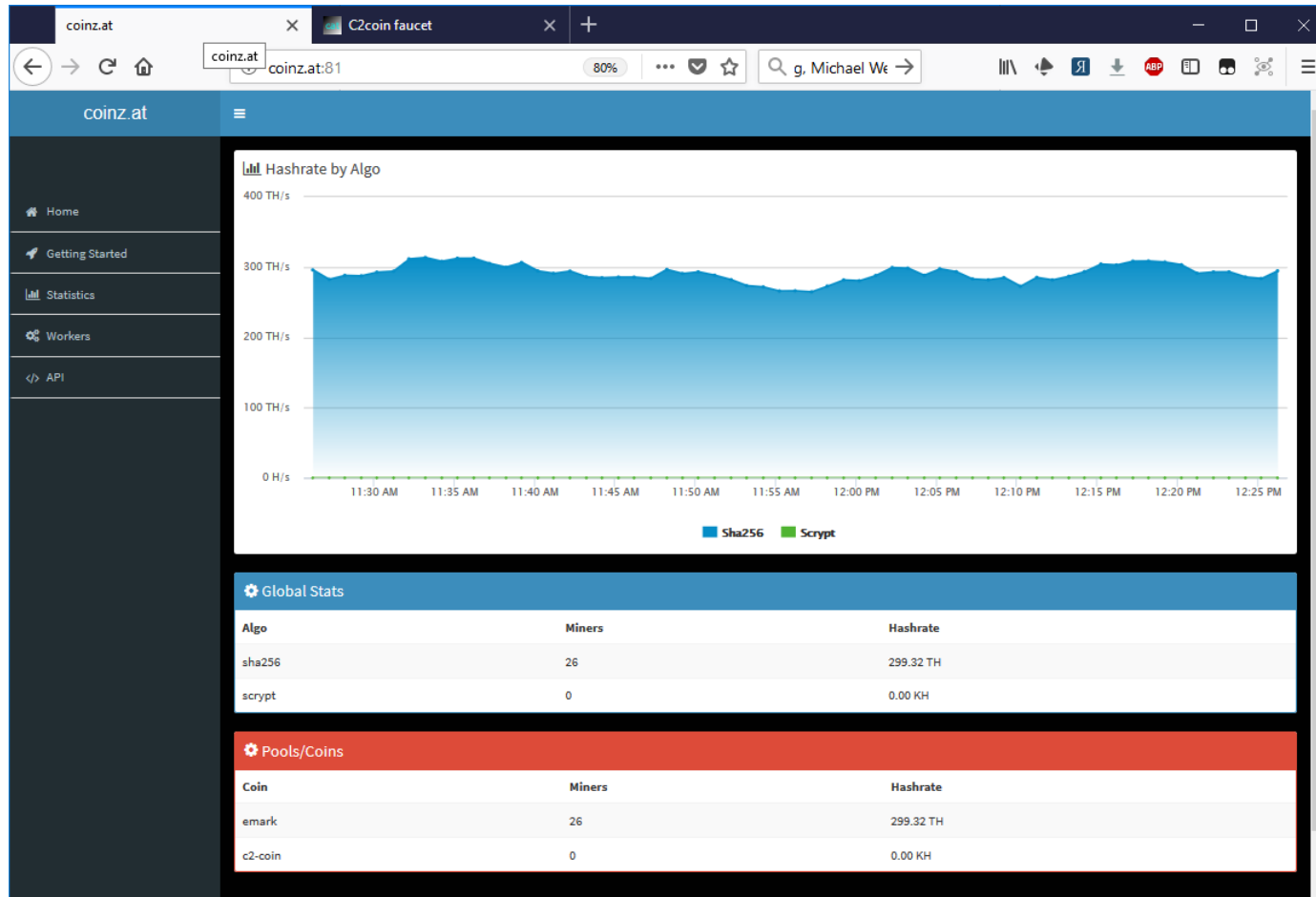
Beispiel: C2coin - Wallet



Beispiel: C2coin – GPU Mining

```
c:\CryptoCoins\cudaminer-2014-02-28\x64\cudaminer.exe
[2018-04-11 10:33:10] 1 miner threads started, using 'scrypt' algorithm.
[2018-04-11 10:33:10] GPU #0: Quadro 600 with compute capability 2.1
[2018-04-11 10:33:10] GPU #0: interactive: 1, tex-cache: 0 , single-alloc: 0
[2018-04-11 10:33:10] GPU #0: 32 hashes / 4.0 MB per warp.
[2018-04-11 10:33:10] GPU #0: using launch configuration F2x16
[2018-04-11 10:33:10] GPU #0: Quadro 600, 20.75 khash/s
[2018-04-11 10:33:15] GPU #0: Quadro 600, 22.67 khash/s
[2018-04-11 10:33:20] GPU #0: Quadro 600, 22.57 khash/s
[2018-04-11 10:33:25] GPU #0: Quadro 600, 22.64 khash/s
[2018-04-11 10:33:30] GPU #0: Quadro 600, 22.64 khash/s
[2018-04-11 10:33:35] GPU #0: Quadro 600, 21.18 khash/s
[2018-04-11 10:33:40] GPU #0: Quadro 600, 21.84 khash/s
[2018-04-11 10:33:42] GPU #0: Quadro 600, 21.67 khash/s
[2018-04-11 10:33:43] accepted: 1/1 (100.00%), 21.67 khash/s (yay!!!)
[2018-04-11 10:33:48] GPU #0: Quadro 600, 22.31 khash/s
[2018-04-11 10:33:53] GPU #0: Quadro 600, 22.10 khash/s
[2018-04-11 10:33:58] GPU #0: Quadro 600, 22.14 khash/s
[2018-04-11 10:34:03] GPU #0: Quadro 600, 22.42 khash/s
[2018-04-11 10:34:08] GPU #0: Quadro 600, 22.61 khash/s
[2018-04-11 10:34:13] GPU #0: Quadro 600, 22.63 khash/s
[2018-04-11 10:34:17] GPU #0: Quadro 600, 22.29 khash/s
[2018-04-11 10:34:18] accepted: 2/2 (100.00%), 22.29 khash/s (yay!!!)
[2018-04-11 10:34:23] GPU #0: Quadro 600, 22.45 khash/s
[2018-04-11 10:34:28] GPU #0: Quadro 600, 22.10 khash/s
```

Beispiel: Miningportal coinz.at



Beispiel: C2coin – „Faucet“

C2coin faucet

C2coin faucet

Enter a C2coin address to receive some coins, e.g. CMPiHHuwwjSpf2fYpxrgMKsZFBjSwEeSW:

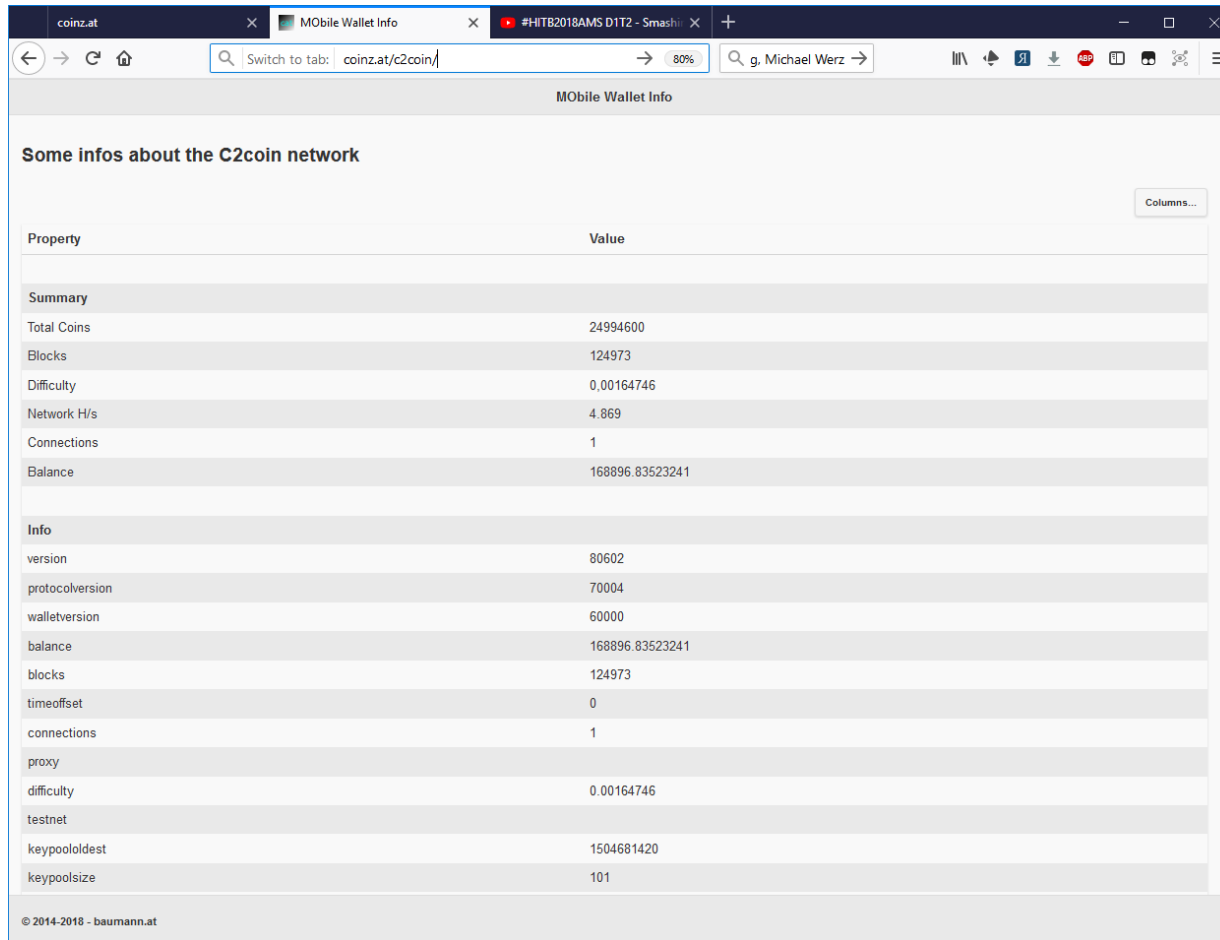
C2coin address:

Cchriszem1FmGh9Tf7hZEziowNN3s2hEDG

Yes - send me some C2coins!

[Back](#)

Beispiel: C2coin – Network Info



coinz.at | MOBILE Wallet Info | #HITB2018AMS D1T2 - Smashii

Switch to tab: coinz.at/c2coin/ | 80% | g. Michael Werz

MOBILE Wallet Info

Some infos about the C2coin network

Columns...

Property	Value
Summary	
Total Coins	24994600
Blocks	124973
Difficulty	0.00164746
Network H/s	4.869
Connections	1
Balance	168896.83523241
Info	
version	80602
protocolversion	70004
walletversion	60000
balance	168896.83523241
blocks	124973
timeoffset	0
connections	1
proxy	
difficulty	0.00164746
testnet	
keypoololdest	1504681420
keypoolsize	101

© 2014-2018 - baumann.at

Beispiel: C2coin – Block Explorer

C2coin block explorer

Connections: 1

Based on RPC Ace v0.6.7

Blocks: 124581

Difficulty: 0.00024414 (= 0.00699 MH/s)

Net hashrate: 0.00018 MH/s (last 10 Blocks)

Net hashrate: 0.00009 MH/s (last 100 Blocks)

Block	Hash	Difficulty	Time (UTC)	Tx# · Value out
124581	<u>39687ae93816239f ...</u>	0.000244 (16)	08:34:13 11-Apr-2018	1 · 200
124580	<u>8e64e92f50f9515d ...</u>	0.000244 (16)	08:33:40 11-Apr-2018	2 · 1600
124579	<u>83eacb3d35a05e4d ...</u>	0.000244 (16)	08:28:07 11-Apr-2018	1 · 200
124578	<u>f5919c1fbbad84a9 ...</u>	0.000244 (16)	08:27:52 11-Apr-2018	1 · 200
124577	<u>82a7e682d9b6948a ...</u>	0.000244 (16)	08:26:13 11-Apr-2018	1 · 200
124576	<u>5257148bc23a5a43 ...</u>	0.000244 (16)	08:25:48 11-Apr-2018	1 · 200
124575	<u>9424957414d3afb9 ...</u>	0.000244 (16)	08:24:46 11-Apr-2018	1 · 200
124574	<u>0b1ec7c761362250 ...</u>	0.000244 (16)	08:24:22 11-Apr-2018	1 · 200
124573	<u>29cb0a1281644d7a ...</u>	0.000244 (16)	17:06:14 10-Apr-2018	2 · 800
124572	<u>de0a3e49aea0e06d ...</u>	0.000244 (16)	16:09:52 10-Apr-2018	1 · 200
124571	<u>e97a4b7d395b3df1 ...</u>	0.000244 (16)	16:07:06 10-Apr-2018	2 · 1400
124570	<u>edfca9e2f7553be9 ...</u>	0.000244 (16)	15:58:39 10-Apr-2018	1 · 200

< Newer

Older >

Beispiel: WalletGenerator

**WalletGenerator.net**
Universal Open Source Client-Side Wallet Generator

Choose currency :

Single Wallet | Paper Wallet | Bulk Wallet | Brain Wallet | Wallet Details | Support

Generate New Address Print

Public Address
**SHARE**
CGqCQCZeFXpjPxxj3sYK6pDXkSenMKTE2mf

Private Key (Wallet Import Format)
**SECRET**
6F XuWRPeNo2RhM7zKCZMrtdJzy5MMzWVuFQAHNn2vSMtKudRi2E

Step 0. Follow the security checklist recommendation
First step is to **download** this website from [Github](#) and open the index.html file directly from your computer. It's just too easy to sneak some evil code in the 6000+ lines of javascript to leak your private key, and you don't want to see your fund stolen. Code version control make it much easier to cross-check what actually run. For extra security, **unplug your Internet access** while generating your wallet.

Step 1. Generate new address
Choose your currency and click on the "Generate new address" button.

Step 2. Print the Paper Wallet
Click the Paper Wallet tab and print the page on high quality setting. **Never save the page as a PDF file to print it later since a file is more likely to be hacked than a piece of paper.**

Step 3. Fold the Paper Wallet
Fold your new Paper wallet following the lines.



Phase 2

- Ethereum based
 - Smart Contracts
 - Oracles
 - Tokens (vgl. ICOs)
- Lab: Ethereum Test-Chain (Private)
 - Bootnode
 - Node (mit On Demand Mining)
 - CPU Mining
- => Setup eigener Node
 - Anleitung siehe https://blockchains.web-lab.at/austriapro/Ethereum-Testnet_20180528.pdf

Ethereum Test-Chain - console

```
C:\Windows\System32\cmd.exe - pc5_bn.cmd

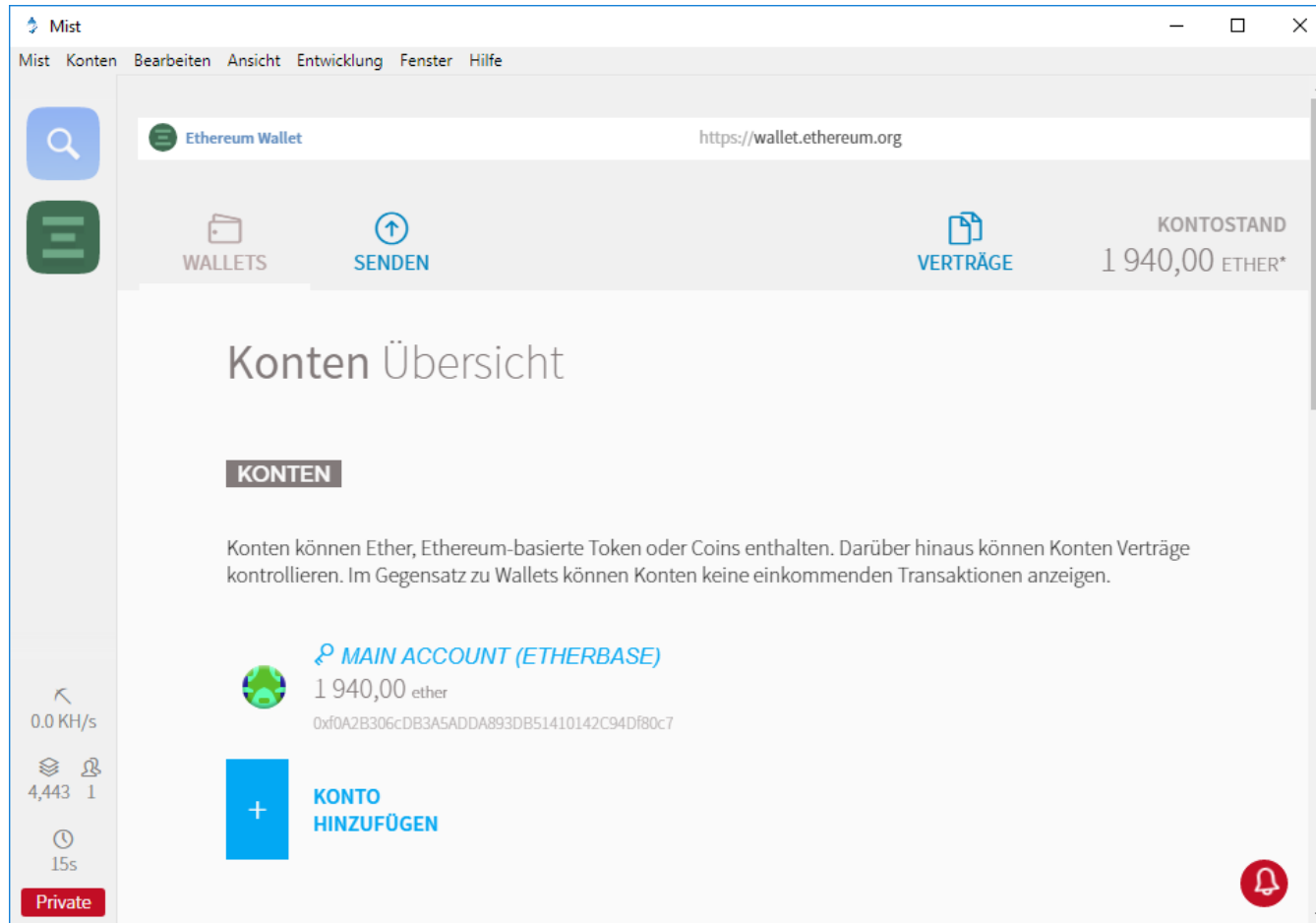
WARN [04-11|10:38:51] Head state missing, repairing chain
INFO [04-11|10:38:51] Rewound blockchain to past state
INFO [04-11|10:38:51] Loaded most recent local header
INFO [04-11|10:38:51] Loaded most recent local full block
INFO [04-11|10:38:51] Loaded most recent local fast block
INFO [04-11|10:38:51] Loaded local transaction journal
INFO [04-11|10:38:51] Regenerated local transaction journal
WARN [04-11|10:38:51] Blockchain not empty, fast sync disabled
INFO [04-11|10:38:51] Starting P2P networking
INFO [04-11|10:38:54] UDP listener up
1789fee25ed8ce2c4b7977e521081fdb6fab8d2575e1ef0e115a59d9c87fcfd5ba7ea2907cede2089c16cbb75@85.124.9.90:30332
INFO [04-11|10:38:54] RLPx listener up
1789fee25ed8ce2c4b7977e521081fdb6fab8d2575e1ef0e115a59d9c87fcfd5ba7ea2907cede2089c16cbb75@85.124.9.90:30332
INFO [04-11|10:38:55] HTTP endpoint opened
INFO [04-11|10:38:55] IPC endpoint opened
Welcome to the Geth JavaScript console!

instance: Geth/c2eth-pc5/v1.8.3-stable-329ac18e/windows-amd64/go1.10
INFO [04-11|10:38:55] Etherbase automatically configured
coinbase: 0x9159e7fc8a8639e812d9624868527703a40baa58
at block: 3602 (Mon, 09 Apr 2018 07:30:47 CEST)
datadir: c:\CryptoCoins\c2eth-chain
modules: admin:1.0 debug:1.0 eth:1.0 miner:1.0 net:1.0 personal:1.0 rpc:1.0 txpool:1.0 web3:1.0

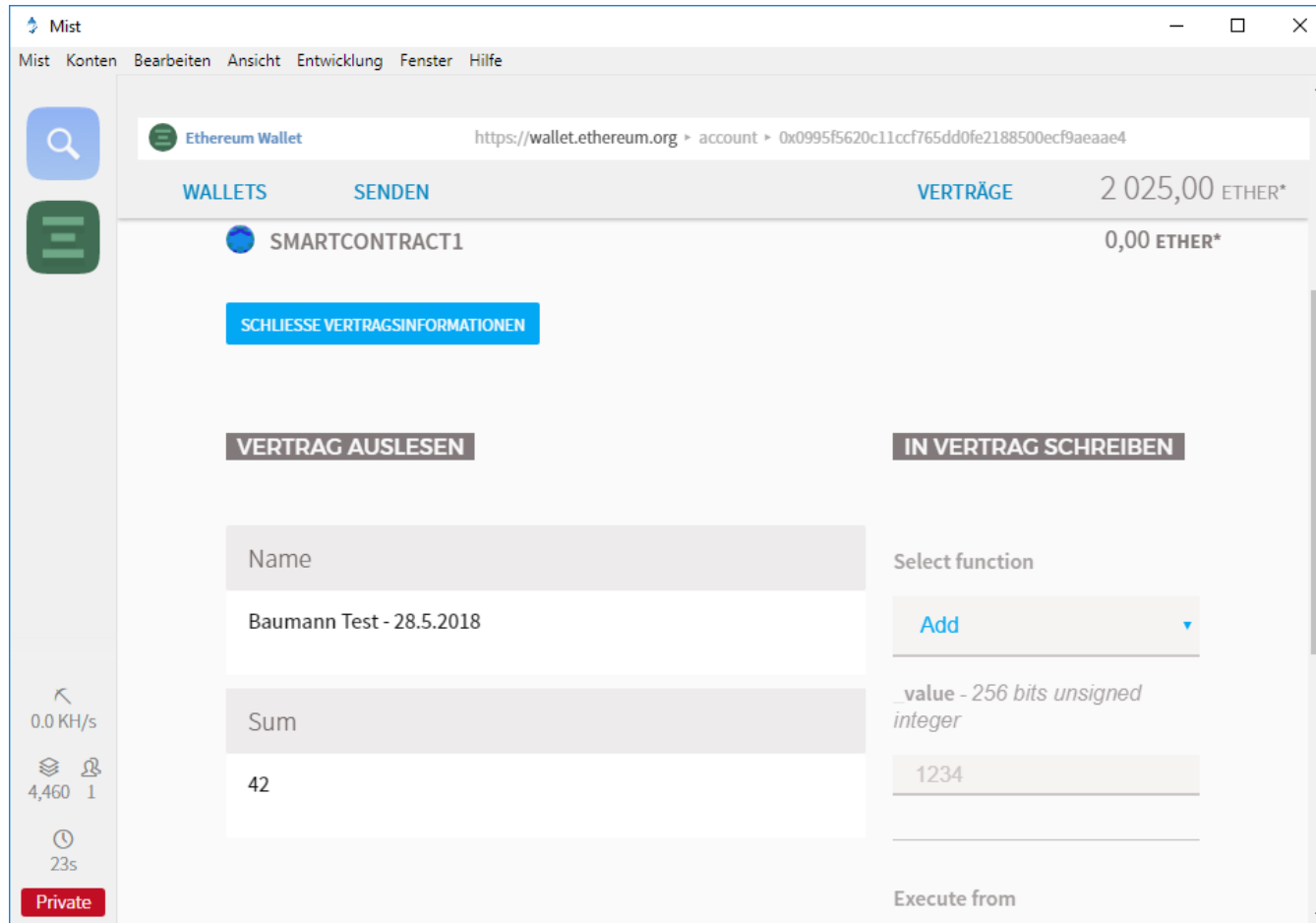
> INFO [04-11|10:39:05] Block synchronisation started
INFO [04-11|10:39:05] Imported new chain segment
.000 number=3609 hash=88cd6e...3b69cc cache=4.95kB
INFO [04-11|10:39:05] Imported new chain segment
0.736 number=3638 hash=12c812...5dd0c6 cache=26.11kB
INFO [04-11|10:39:05] Imported new chain segment
s=2.271 number=3755 hash=c818a4...1b9c2d cache=94.47kB
number=3755 hash=c818a4...1b9c2d
number=3602 hash=703b25...eb8bd4
number=3755 hash=c818a4...1b9c2d td=2505735899
number=3602 hash=703b25...eb8bd4 td=2459503000
number=3755 hash=c818a4...1b9c2d td=2505735899
transactions=0 dropped=0
transactions=0 accounts=0
self=enode://92f61c5ab4e4a999b05733ad68abddde9649351
self=enode://92f61c5ab4e4a999b05733ad68abddde9649351
url=http://127.0.0.1:8000 cors=* vhosts=localhost
url=\\\\.\\pipe\\geth.ipc

blocks=7 txs=0 mgas=0.000 elapsed=75.163ms mgasps=0
blocks=29 txs=2 mgas=0.060 elapsed=81.251ms mgasps=
blocks=117 txs=8 mgas=0.234 elapsed=103.071ms mgasp
```

Ethereum Test-Chain - „Mist“ - Wallet



Ethereum Test-Chain - Smart Contract



News

- => 19.9.2018

Smart Contract - Code

```
pragma solidity ^0.4.18;

contract MyContract {
    string public name;
    uint256 public sum;

    constructor(uint256 psum, string pname) {
        sum = psum;
        name = pname;
    }

    function add(uint256 _value) {
        sum += _value;
    }

    function setName(string _name) {
        name = _name;
    }
}
```

Smart Contract – „Beobachten“

- „Installieren“ in eigener Umgebung (Wallet)
- Adresse und Schnittstelle müssen bekannt sein

Ethereum Wallet

Verträge beobachten

VERTRAGSADRESSE

 0x0995f5620C11CCF765DD0FE2188500ECf9A

VERTRAGSNAME

Test 2

JSON SCHNITTSTELLE

```
[ { "constant": true, "inputs": [],  
  "name": "name", "outputs": [ {  
    "name": "", "type": "string", "value":  
    "newName" } ], "payable": false,  
  "type": "function" }, { "constant":  
  false, "inputs": [ { "name": "value",  
    "type": "uint256" } ], "name": "add",  
  "outputs": [], "payable": false,  
  "type": "function" }, { "constant":  
  true, "inputs": [], "name": "sum",
```

ABBRECHEN OK

Smart Contract - Nutzung

- Aufrufen von definierten Funktionen
- Übergabe von Parameter/n
- Bezahlen der Gebühr ("Gas")
- <http://blockchains.web-lab.at/austriapro/MyContract1.js>

Vertrag Auslesen

Name

Baumann Test 18.9.2018

Sum

42

In Vertrag Schreiben

Select function

Add ▼

_value - 256 bits unsigned integer

1

Execute from

  Account 1 - 3

AUSFÜHREN

Phase 3 - MultiChain

- MultiChain - Node
 - Installiert im Lab
 - Web-GUI
- Demo
- Setup eigener Node
- Next Steps

MultiChain Web-GUI

- Node hat kein GUI
 - API Schnittstelle (RPC über https/JSON)
 - => Web-GUI
- <https://blockchains.web-lab.at/austriapro/multichain/>
- Credentials (s.a. Mailing)

MultiChain Web-GUI

The screenshot displays the MultiChain Web-GUI interface in a browser window. The URL is <https://blockchains.web-lab.at/austriapro/multichain/>. The page title is "MultiChain – AustriaPro Lab (node: ap)". A navigation bar includes links for Node, Permissions, Asset: Issue | Update, Send, Stream: Create | Publish, View, Blocks, Infos, and a help icon.

This Node

Name	apro-lab-1
Description	MultiChain apro-lab-1
Version	2.0 alpha 3
Protocol	20003
Node address	apro-lab-1@88.99.145.156:7177
Blocks	128
Peers	1

Addresses

Label	ap@fra – change label
Address	1Nvs6cxwXn9K1CQM5Ak7d7aSkwEhyGcsPzmhV
Permissions	connect, send, receive, issue, create, mine, admin, activate – change

[Get new address](#)

Connected Nodes

Node IP address	85.124.9.90
Version/Subver	70002 /MultiChain:0.2.0.3/
Handshake address	1bYr6FsUCYgEZdMj8DT7cdB5Yzw2E8zpNRuv2
Latency	0.130 sec
Connection Time	2018-09-19 07:35:08 GMT
Send: Last / Size	2018-09-19 08:46:19 GMT / 0.07 MB
Recv: Last / Size	2018-09-19 08:46:19 GMT / 0.06 MB

- **Infos**
 - Node, Permissions, Infos, Help
- **Assets**
 - Issue
 - Update
 - Send
- **Streams**
 - Create
 - Publish
 - View
- **Blocks**

MultiChain Setup Node

- Download, Infos, Tutorials ...
 - <https://www.multichain.com/>
 - Aktuell Version 2.0 alpha 4
- In Verzeichnis entpacken
 - oder selbst compilieren ;-)
- Erster Start
 - `multichaind` [apro-lab-1@88.99.145.156:7177](#)
 - public key wird angezeigt
 - => an uns senden => Freigabe
- Start
 - `multichaind apro-lab-1`

MultiChain Next Steps

- Sie
 - Node installieren
 - Eigene Entwicklungen?
 - Web-GUI
 - API
 - Basis: <https://github.com/MultiChain>
- Wir
 - Weitere Demos: Wünsche/Vorschläge?
 - (Notarization, Messdaten, Zertifikate ...)
 - Sourcecode auf Labs-Homepage und/oder
 - <https://github.com/austriapro>

News - 24.10.2018

- Notarization (Proof Of Existence)
 - Demo unter Nutzung der „apro-lab-1“ MultiChain
- Demos (Anders Brownworth)
 - Blockchain Demo
 - Public/Private Keys & Signing
- Ausblick / Phase 4
 - “etwas weniger technisch”
 - Blockchain 3.0?

Usecase - Proof Of Existence

- Elektronische Dokumente
 - kopierbar, veränderbar
 - Beweis für Authentizität in realen Welt aufwändig & teuer
- => Notarization („Proof of existence“)
- Beweis, dass ein (elektronisches) Dokument existiert (hat)
 - zu einem bestimmten Zeitpunkt
 - in einer bestimmten Form

Usecase - Proof Of Existence

Proof Of Existence (Notarization)

Create Verify

Proof Of Existence - Create

Detaillierte Beschreibung in Deutsch siehe <https://www4.baumann.at/proof-of-existence-auf-basis-blockchain/>.

Notarization ("Proof Of Existence") is the process of storing a hash value of a document ("fingerprint") in a blockchain. The existence and integrity of the document at a certain time can be proven later.

To create a PoE choose a file you want to certify. The file is NOT uploaded to the server, the hash is calculated from your browser locally. Optionally you can enter a remark and choose, if the filename should also be included in the remark.

Select File:

Browse... AustriaPro-Blockchain-eDay2018_V1.ppt

Calculated Hash (SHA256):

60e9b7c8c131703b2d074f6519eec0a13981188ebec92ffb909b2654f4e71b53

Filename:

AustriaPro-Blockchain-eDay2018_V1.ppt

Remarks (optional):

Options:

☒ Include filename

Submit

Proof of Existence successfully published to Blockchain. PLEASE KEEP THIS INFORMATION!

Transaction: 8b7a3f43b3efdb20e94c83c54fe7fb92a4274e9a68fff5ee09d12a3ab5a7d7cf
Hash: 60e9b7c8c131703b2d074f6519eec0a13981188ebec92ffb909b2654f4e71b53

Additional information:
Service/Publisher <https://blockchains.web-lab.at/poe/>
Filename: AustriaPro-Blockchain-eDay2018_V1.ppt

Verifying Transaction

Transaction found 8b7a3f43b3efdb20e94c83c54fe7fb92a4274e9a68fff5ee09d12a3ab5a7d7cf

TxID: 8b7a3f43b3efdb20e94c83c54fe7fb92a4274e9a68fff5ee09d12a3ab5a7d7cf
Hash:
Data: Service/Publisher <https://blockchains.web-lab.at/poe/>
Filename: AustriaPro-Blockchain-eDay2018_V1.ppt
Time: 2018-04-11 08:13:06 GMT

Blockhash: 00d74fe91b6e2ae4c64bd43c109aba9f3fc5382f7e00f413348784ac0a78f9bb
Blocktime: 2018-04-11 08:13:06 GMT
Confirmations: 5

- Beweis
 - Hashwert + Zeitstempel
 - (optional Zusatzinfos)
- Identifikation
 - Hashwert oder
 - TransaktionsID

Blockchain Demo

Blockchain Demo

Hash

Block

Blockchain

Distributed

Tokens

Coinbase

SHA256 Hash

Data:

Testdaten ...

Hash:

6d8e3f8659ba2c9cd0e85a541c3e6016b594e5876a9a6121e11bae77d064386a

Block

Block:

1

Nonce:

26190

Data:

abc

Hash:

00009acc5e797

Mine

Blockchain

Block:

1

Nonce:

94976

Data:

abc

Prev:

00

Hash:

0000f17fe01164b906cc72d919e5e12963e8482a9f8851f090f

Mine

Block:

2

Nonce:

25056

Data:

def

Prev:

0000f17fe01164b906cc72d919e5e12963e8482a9f8851f090f

Hash:

00001431261f8f79e4ca86980c2e3c2f2a7896

Mine

Keys & Signing Demo

Blockchain Demo: Public / Private Keys & Signing

Keys Signatures Transaction Blockchain

Public / Private Key Pairs

Private Key

37663651383266050485684060949831083417949236641256608090508702210331047835634

Random

Public Key

044461647970c1e3c16708ea3efde8ad1a5f3f0eda9e934a8793731dd1351b79672ead144bcdbec902bcad4c48dd3ed4

Signatures

Sign Verify

Message

Daten: 123

Private Key

376636513832660

Message Signature

3045022100a40ad

Message

Daten: 123

Public Key

04446164797

Signature

3045022100a

Transaction

Sign Verify

Message

\$ 20.00

From:

044461647970c1e3c16708ea3e

->

04cc955bf8e35

Signature

3046022100d8f794c8ac309679ba87c6fbb0f4236bd991826b335fbbd2319b9db8a3ae524b022100e1ae13

Verify

Blockchain 3.0?

- 3.0:
 - Schneller, skalierbarer ...
 - Ökonomischer ...
 - Smart contracts ...
- Digital Assets „integriert“
- Waves Platform
 - „Blockchain for the people“
 - <https://wavesplatform.com/>
- => Obsnetwork
 - „Blockchain for the real world“
 - <https://obsnetwork.com/>

Waves / Obsnetwork

- Plattform für digitale Geschäftsmodelle
 - Fund Raising
 - Loyalty
 - Tracking/Tracing
 - Supply Chain
 - ...
- Digital Assets („Tokens“) integriert
 - issue, store, manage, trade
- Decentralized Exchange
- Gateways zu Krypto und Fiat-Währungen

Waves / Obsnetwork – im Lab

- Testnet in AustriaPro Lab
 - Client: tbd
 - Node für API Tests: tbd
- Testnet Obs
 - <https://client.testnet-0bsnetwork.com>
 - <https://node1.testnet-0bsnetwork.com>
 - <https://explorer.testnet-0bsnetwork.com>
- Waves
 - <https://wavesplatform.com/>

Startseite Lab

- <https://blockchains.web-lab.at/austriapro/>

Phase 2: Ethereum based (smart contracts)

Privates Ethereum Test-Netz

- [Setup-Anleitung](#)
- [Smart Contracts - Beispiel 1](#)

Phase 3: Multichain

Node AustriaPro Lab

- [Web-GUI](#)
- [Proof Of Existence - Demo](#)

Demos

- [Blockchain Demo](#) - By Anders Brownworth
- [Public/Private Keys & Signing](#) - By Anders Brownworth

News 17.1.2019

- Multichain Node mit Docker (siehe unten)
- API Library für Multichain API
 - Siehe github
- Obsnetwork (Test) Fullnode (siehe unten)
- Demo Clients – Sourcecode siehe Github
 - Python
<https://github.com/austriapro/blockchain/tree/master/0bs-samples/python>
 - PHP
<https://github.com/austriapro/blockchain/tree/master/0bs-samples/php>

Multichain Node mit Docker

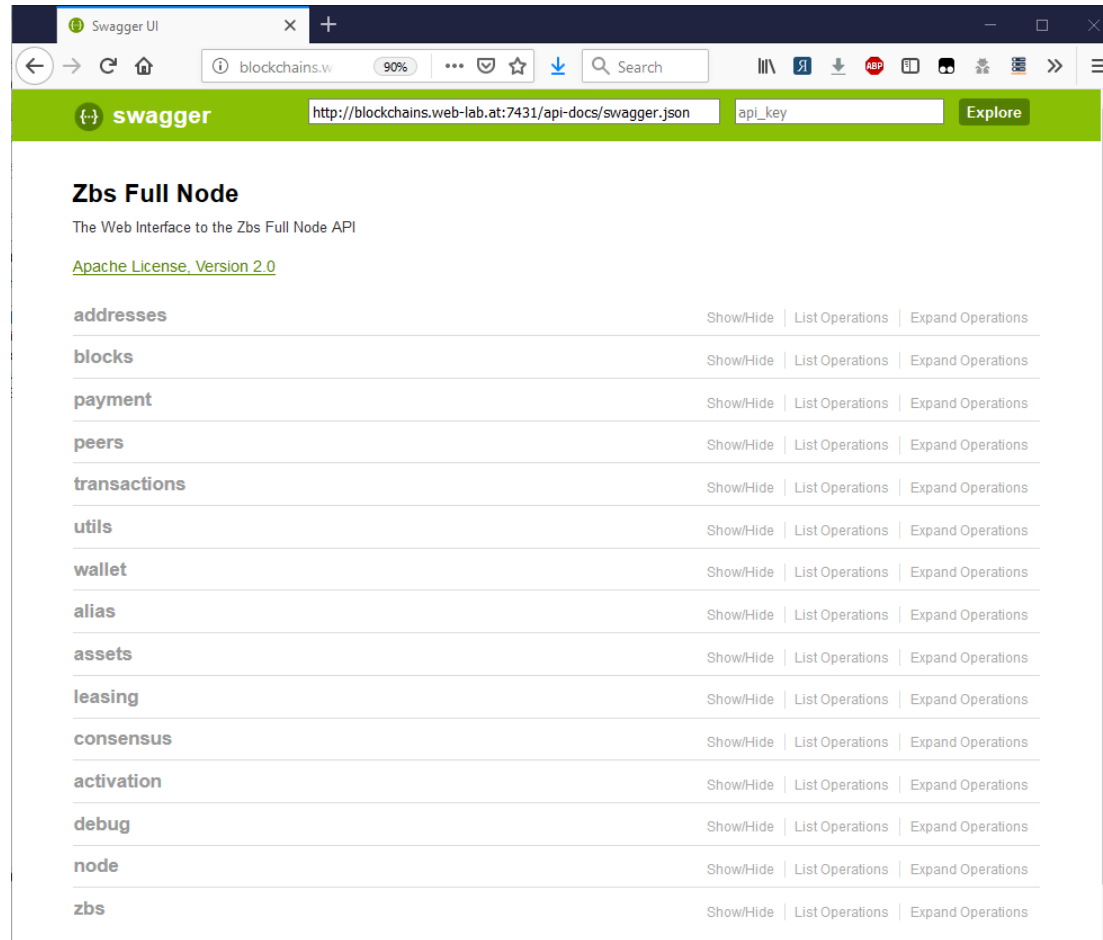
- Vereinfachtes Setup von Multichain Nodes mit Docker
 - Containerumgebung für Applikationen
 - Alle Betriebssysteme (Windows, Mac, Linux ...)
- Am Beispiel „apro-lab-1“
- Setup & Konfiguration
 - in 8 (einfachen) Schritten
- Anleitung und Scripts siehe
 - <https://github.com/austriapro/blockchain>



Obsnetwork.com

- Details zum System siehe letzter AK
- Obs Fullnode im Testnetz
 - Incl. aktivem API
 - <http://blockchains.web-lab.at:7431>
- 2 Demos
 - Python: Infos zu einer Walletadresse und einem Asset
 - Php: Infos zu allen Assets einer Adresse
- Code auf Github
 - <https://github.com/austriapro/blockchain/tree/master/0bs-samples/>

Obs Fullnode mit API



Obs Demo (Python) Code

```
NODE = 'http://88.99.145.156:7431'
NETWORK = 'testnet'
ADDR = '3Mthq2HwiU4V2AqUmCsT9BV6UTB9MUV5eU9'

pw.setNode(NODE, NETWORK)
ADDRESS = pw.Address(address=ADDR)

print('-----');
print("Demo getting infos about an address and an asset:")
print('-----');
print("Using the following address:")
print(ADDRESS.address)
print('-----');
print("Infos about address:")
print(ADDRESS)

print('-----');
balance = ADDRESS.balance()
print('Balance Obsnetwork Coin: %s' % (balance / 100000000))

AProV1_ID = 'FH6t21twyAwDeR7J2TTp7zQEAq5rXBvyfWvK8QMvfRAZ'
balance = ADDRESS.balance(AProV1_ID)
print('Balance AustriaPro Token V1: %s' % (balance / 1000000))

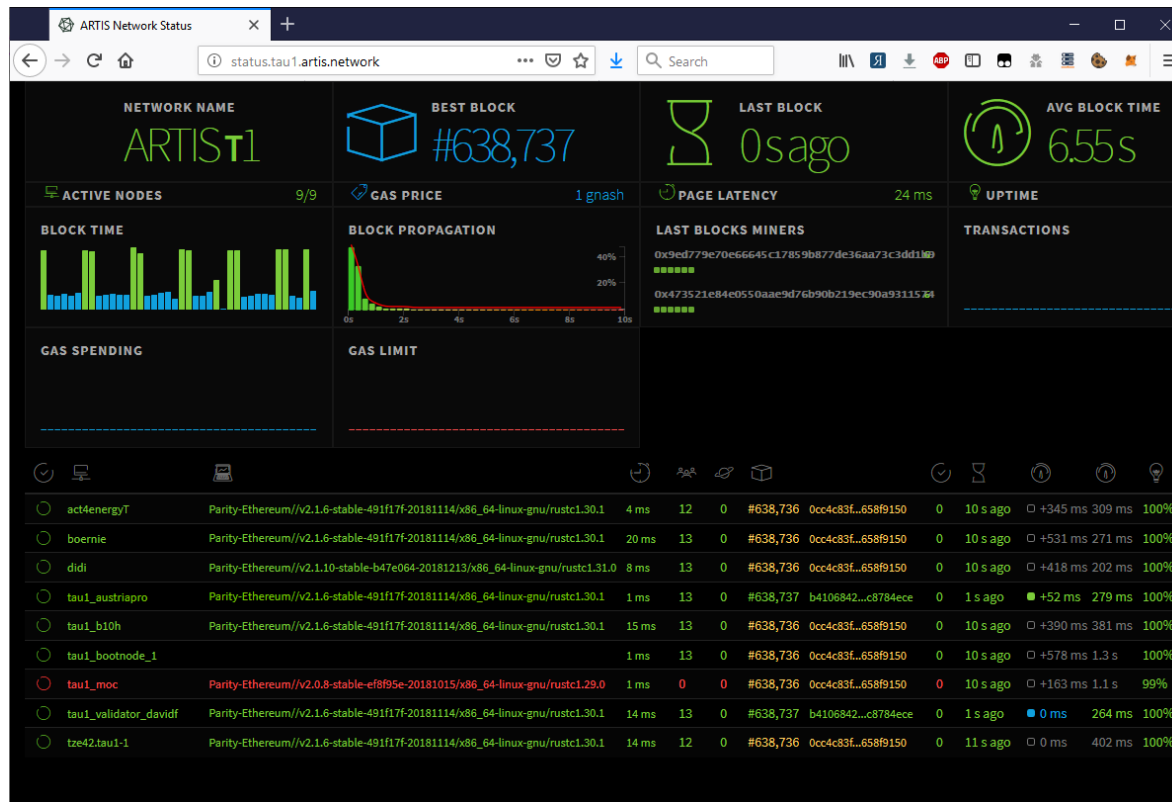
AProV1 = pw.Asset(AProV1_ID)
print('-----');
print('Info about Asset:')
print(AProV1)
```

Obs Demo (Python) Output

```
chris@cb-pc5: /mnt/c/Users/baumann/Dropbox/dev7/0bsnetwork/python
chris@cb-pc5:/mnt/c/Users/baumann/Dropbox/dev7/0bsnetwork/python$ python apro-demo-address.py
-----
Demo getting infos about an address and an asset:
-----
Using the following address:
3Mthq2HwiU4V2AqUmCsT9BV6UTB9MUV5eU9
-----
Infos about address:
address = 3Mthq2HwiU4V2AqUmCsT9BV6UTB9MUV5eU9
publicKey =
privateKey =
seed =
nonce = 0
balances:
  Waves = 50000000000
  GavX8vzkqv7ew3J2V1PMC2TCzoGM2Lt7amms2G3NaMU2 (BATT1) = 1000
  FH6t21twyAwDeR7J2TTP7zQEAq5rXBvyfWvK8QMvfRAZ (AustriaPro V1) = 50000000
-----
Balance 0bsnetwork Coin: 500
Balance AustriaPro Token V1: 50
-----
Info about Asset:
status = Issued
assetId = FH6t21twyAwDeR7J2TTP7zQEAq5rXBvyfWvK8QMvfRAZ
issuer = 3MpZXYBKdsMKGWzNxmNSm27QPYHmev7jB5K
name = AustriaPro V1
description = AustriaPro Test Token V1
quantity = 100000000
decimals = 2
reissuable = True
chris@cb-pc5:/mnt/c/Users/baumann/Dropbox/dev7/0bsnetwork/python$
```

Artis Testnetz (lab10 collective)

AustriaPro Node, status siehe <http://status.tau1.artis.network/>



Kontakt

AUSTRIAPRO

<http://www.austriapro.at>
austriapro@wko.at

DI Dr. Christian Baumann
c.baumann@baumann.at
+43 664 43 24 243