THE CREATION OF NARUCOIN

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Introduction

This report provides information about the process of creating an Altcoin. By following the Summer Course Instruction and the example Seccloin, the new Altcoin named Narucoin was created.

The *input.txt* file was modified with new customized values for the Narucoin. The values are created the knowledge based on the comparison of the same values between Litecoin [7], Bitcoin [6]and Seccloin. Table 1 shows the comparison of some values between these Altcoins.

	Narucoin	**Seccloin**	**Litecoin**	**Bitcoin**
Naming	Narucoin	Seccloin	Litecoin	Bitcoin
	NaruCoin	SecCloin	LiteCoin	BitCoin
	NARC There have not yet been the use of NARC from Cryptocompare and Coingecko.	SCLO	LTC	BTC
	sasus	molecules	lites	mBTC
	borus	atoms	photons	uBTC or bits
pchMessageStart: Just random hex numbers	0x4e	0xab	0xfb	0xf9
	0x61	0xbc	0xc0	0xbe
	0x72	0xcd	0xb6	0xb4
	0x55	0xde	0xdb	0xd9
Peer-to-peer Port	21028	10028	9333	8333
Public key address	53	63	48	25
Script address	10	6	5	5
Script address 2	55	51	50	
Secret key	181	177	176	128
For creating the Genesis block: Pick the Unix time, one headline of the day and run the Genesis0 code.	1558069381	1555230000		
	ZDNEt 17 May 2019 Stack Overflow says hackers breached production systems	Blah 14 Apr 2019		
	1041753	1859400		

TABLE 1 NARUCOIN VALUES FOR INPUT.TXT

After completing the new *input.txt* file, the *RunMe1st.sh* was executed to generate the Docker image *coin02*. With this *coin02*, the Narucoin could be run in multiple Docker containers to do the mining.

In the beginning, the mined coins were in the field *immature_balance* when running the command *getwalletinfo.* The command to mine coins in a node is wrapping the *generatetoaddress* in a loop to reach the target number of blocks:

```
for i in {1..120} ; do echo $i; narucoin-cli generatetoaddress 10
NTdFGbks6aCVr2Y2QijUEU7G3HTmt5Y7cQ; done
```

After 120 blocked mined, the very first mined coins were getting activated and were transferred into the field *balance*. From this point, the Narucoin could be transferred between nodes using the command *sendtoaddress [4]*.

To improve the number of mined coins, some extra works were also applied.

Interaction with Narucoin

In the *bigmem.item.ntnu.no* server, there is one image *coin02:luong.tran* that was imported from Docker Hub [1]. We can create one container that points to the wallet data in */home/luong.tran/data* with this command:

```
docker run -P -dit --name node01-luong.tran -v "$PWD/data:/root/.narucoin/" -w /root
coin02:luong.tran
```

Then run the narucoind node:

```
docker exec -it b9a86f7a4b90 /bin/bash

narucoind -daemon
```

Currently, the container name *node01-luong.tran* has been already created and is running now. We can check the wallet, accounts and the blockchain info inside the container by ssh to it and run:

```
docker exec -it b9a86f7a4b90 /bin/bash

narucoin-cli getwalletinfo

narucoin-cli listaccounts

narucoin-cli getblockchaininfo
```

Extra works with Narucoin

The extra works include:

- Extracting the Narucoin source from the image *coin02* so the coin can be built in different independent nodes.
- The Narucoin source was uploaded [2] to be deployed in different nodes in the same LAN network or on Cloud instances.
- Those nodes can be connected in a network by adding the nodes with field *addnode* in the file *narucoin.conf.*
- To connect the Narucoin instance running inside a Docker container to the instance running in a Cloud service, we can use the SSH Port Forwarding technique [3].
  For example:
    - There are two instances:

        - One is in the Docker container with the port mapping *32772* for the peer-to-peer (P2P) port *21028*

```
c4bbaa83f488        coin02              "/bin/bash"         13 days ago         Exited
(255) 7 days ago   0.0.0.0:32777->9332/tcp, 0.0.0.0:32776->9333/tcp, 0.0.0.0:32775->193
32/tcp, 0.0.0.0:32774->19335/tcp, 0.0.0.0:32773->19444/tcp, 0.0.0.0:32772->21028/tcp, 0
.0.0.0:32771->21128/tcp, 0.0.0.0:32770->21228/tcp, 0.0.0.0:32769->41432/tcp, 0.0.0.0:32
768->61432/tcp   node01
```

        - One is in the Google Cloud Platform with the public ip address *35.228.63.10* which has opened the P2P port 21028

    ⇨ In the Narucoin container, we can use *addnode 35.228.63.10:21028* to the Cloud node. Then to allow the Cloud node able to connect back to the Narucoin container, we can use the Remote forwarding technique of SSH by routing all requests to *localhost:20000* to the port mapping *32722* of the Narucoin container:

    ```
    ssh -R 20000:localhost:32722 luong.tran@35.228.63.10
    ```

    ⇨ In the Cloud node, we now just need to *addnode 127.0.0.1:20000* to allow the Cloud node to connect to the Narucoin container.

- The build of Narucoin in each node were speed up by adding the flag *--without-gui* in the *./configure* command [7].

The future work can be:

- Applying the Gitian build to generate distribution binaries of the Narucoin so the deployment time can be reduced by just distributing the binaries in different Operating System and able to run the coin system without requiring the Root privilege [5].

References

[1] Docker hub. https://cloud.docker.com/repository/registry-1.docker.io/khiem111189/narucoin. (Accessed on 05/30/2019).

[2] khiem111189/narucoin: Summer School 2019. Forked from Litecoin. https://github.com/-khiem111189/narucoin. (Accessed on 05/30/2019).

[3] SSH port forwarding - Example, command, server config | SSH.COM. https://www.ssh.com/ssh/-tunneling/example. (Accessed on 05/30/2019).

[4] Original Bitcoin client/API calls list - Bitcoin Wiki. https://en.bitcoin.it/wiki/-Original_Bitcoin_client/API_calls_list, May 2019. (Accessed on 05/30/2019).

[5] Github. devrandom/gitian-builder: Build packages in a secure deterministic fashion inside a VM. https://github.com/devrandom/gitian-builder. (Accessed on 05/30/2019).

[6] Github. Bitcoin Core. https://github.com/bitcoin/bitcoin, May 2019. (Accessed on 05/30/2019).

[7] Github. Litecoin source. https://github.com/litecoin-project/litecoin, May 2019. (Accessed on 05/30/2019).