

Installing MultiChain on Linux

```

devel1@VBXLFD271:~/Escritorio/MULTICHAIN_MATERIAL$ su -
Contraseña:
root@VBXLFD271:~# 

root@VBXLFD271:~# mkdir tmp
root@VBXLFD271:~# cd tmp
root@VBXLFD271:~/tmp# pwd
/root/tmp

root@VBXLFD271:~/tmp# wget https://www.multichain.com/download/multichain-
1.0.6.tar.gz
--2018-10-27 15:12:58-- https://www.multichain.com/download/multichain-
1.0.6.tar.gz
Resolviendo www.multichain.com (www.multichain.com)... 162.243.214.85
Conectando con www.multichain.com (www.multichain.com)
[162.243.214.85]:443... conectado.
Petición HTTP enviada, esperando respuesta... 200 OK
Longitud: 10028071 (9,6M) [application/x-gzip]
Guardando como: "multichain-1.0.6.tar.gz"

multichain-1.0.6.tar.gz          100%
[=====>]   9,56M  2,19MB/s    en 6,5s

2018-10-27 15:13:05 (1,48 MB/s) - "multichain-1.0.6.tar.gz" guardado
[10028071/10028071]

root@VBXLFD271:~/tmp# tar -xvzf multichain-1.0.6.tar.gz
multichain-1.0.6/
multichain-1.0.6/multichain-util
multichain-1.0.6/multichain-cli
multichain-1.0.6/README.txt
multichain-1.0.6/multichainind
multichain-1.0.6/multichainind-cold

root@VBXLFD271:~/tmp/multichain-1.0.6# ls -la
total 23180
drwxrwxr-x 2 devel1 devel1 4096 ago  2 13:50 .
drwxr-xr-x 3 root   root   4096 oct 27 15:13 ..
-rwxr-xr-x 1 devel1 devel1 2869048 ago  2 13:48 multichain-cli
-rwxr-xr-x 1 devel1 devel1 9422872 ago  2 13:48 multichainind
-rwxr-xr-x 1 devel1 devel1 9090584 ago  2 13:48 multichainind-cold
-rwxr-xr-x 1 devel1 devel1 2297144 ago  2 13:48 multichain-util
-rw-r--r-- 1 devel1 devel1  40087 ago  2 14:06 README.txt

root@VBXLFD271:~/tmp/multichain-1.0.6# mv --verbose multichainind multichain-
cli multichain-util /usr/local/bin
renamed 'multichainind' -> '/usr/local/bin/multichainind'
renamed 'multichain-cli' -> '/usr/local/bin/multichain-cli'

```

```
renamed 'multichain-util' -> '/usr/local/bin/multichain-util'
```

Como Usuario

```
devel1@VBXLFD271:~$ multichain-util create DemoChain
MultiChain 1.0.6 Utilities (latest protocol 10011)

Blockchain parameter set was successfully generated.
You can edit it in /home/devel1/.multichain/DemoChain/params.dat before
running multichaind for the first time.

To generate blockchain please run "multichaind DemoChain -daemon".
```

```
devel1@VBXLFD271:~$ tree /home/devel1/.multichain/DemoChain/
/home/devel1/.multichain/DemoChain/
├── multichain.conf
└── params.dat

0 directories, 2 files
```

Contenido de /home/devel1/.multichain/DemoChain/params.dat

```
# === MultiChain configuration file ===

# Created by multichain-util
# Protocol version: 10011

# The following parameters can only be edited if this file is a prototype
# of another configuration file.
# Please run "multichain-util clone DemoChain <new-network-name>" to
# generate new network.

# Basic chain parameters

chain-protocol = multichain          # Chain protocol: multichain
                                         (permissions, native assets) or bitcoin
chain-description = MultiChain DemoChain # Chain description, embedded in
                                         genesis block coinbase, max 90 chars.
root-stream-name = root               # Root stream name, blank means no
                                         root stream.
root-stream-open = true                # Allow anyone to publish in root
                                         stream
```

```

chain-is-testnet = false                      # Content of the 'testnet' field of
API responses, for compatibility.
target-block-time = 15                         # Target time between blocks
(transaction confirmation delay), seconds. (2 - 86400)
maximum-block-size = 8388608                   # Maximum block size in bytes.
(1000 - 10000000000)

# Global permissions

anyone-can-connect = false                    # Anyone can connect, i.e. a
publicly readable blockchain.
anyone-can-send = false                       # Anyone can send, i.e. transaction
signing not restricted by address.
anyone-can-receive = false                    # Anyone can receive, i.e.
transaction outputs not restricted by address.
anyone-can-receive-empty = true               # Anyone can receive empty output,
i.e. without permission grants, asset transfers and zero native currency.
anyone-can-create = false                     # Anyone can create new streams.
anyone-can-issue = false                      # Anyone can issue new native
assets.
anyone-can-mine = false                       # Anyone can mine blocks (confirm
transactions).
anyone-can-activate = false                   # Anyone can grant or revoke
connect, send and receive permissions.
anyone-can-admin = false                      # Anyone can grant or revoke all
permissions.
support-miner-precheck = true                # Require special metadata output
with cached scriptPubKey for input, to support advanced miner checks.
allow-arbitrary-outputs = false               # Allow arbitrary (without clear
destination) scripts.
allow-p2sh-outputs = true                     # Allow pay-to-scripthash (P2SH)
scripts, often used for multisig. Ignored if allow-arbitrary-outputs=true.
allow-multisig-outputs = true                 # Allow bare multisignature
scripts, rarely used but still supported. Ignored if allow-arbitrary-
outputs=true.

# Consensus requirements

setup-first-blocks = 60                       # Length of initial setup phase in
blocks, in which mining-diversity,
                                                 # admin-consensus-* and mining-
requires-peers are not applied. (1 - 31536000)   # requires-peers are not applied. (1 - 31536000)
mining-diversity = 0.3                          # Miners must wait <mining-
diversity>*<active miners> between blocks. (0 - 1)   # Miners must wait <mining-
diversity>*<active miners> between blocks. (0 - 1)
admin-consensus-upgrade = 0.5                  # <admin-consensus-upgrade>*<active
admins> needed to upgrade the chain. (0 - 1)   # <admin-consensus-upgrade>*<active
admins> needed to upgrade the chain. (0 - 1)
admin-consensus-admin = 0.5                    # <admin-consensus-admin>*<active
admins> needed to change admin perms. (0 - 1)   # <admin-consensus-admin>*<active
admins> needed to change admin perms. (0 - 1)
admin-consensus-activate = 0.5                 # <admin-consensus-activate>*
<active admins> to change activate perms. (0 - 1)   # <admin-consensus-activate>*
<active admins> to change activate perms. (0 - 1)
admin-consensus-mine = 0.5                     # <admin-consensus-mine>*<active
admins> to change mining permissions. (0 - 1)   # <admin-consensus-mine>*<active
admins> to change mining permissions. (0 - 1)
admin-consensus-create = 0.0                   # <admin-consensus-create>*<active
admins> to change create permissions. (0 - 1)   # <admin-consensus-create>*<active
admins> to change create permissions. (0 - 1)
admin-consensus-issue = 0.0                     # <admin-consensus-issue>*<active
admins> to change issue permissions. (0 - 1)   # <admin-consensus-issue>*<active
admins> to change issue permissions. (0 - 1)

```

```
admins> to change issue permissions. (0 - 1)
```

Defaults for node runtime parameters

```
lock-admin-mine-rounds = 10          # Ignore forks that reverse changes
in admin or mine permissions after this many mining rounds have passed.
Integer only. (0 - 10000)
mining-requires-peers = true        # Nodes only mine blocks if
connected to other nodes (ignored if only one permitted miner).
mine-empty-rounds = 10              # Mine this many rounds of empty
blocks before pausing to wait for new transactions. If negative, continue
indefinitely (ignored if target-adjust-freq>0). Non-integer allowed. (-1 - 1000)
mining-turnover = 0.5               # Prefer pure round robin between a
subset of active miners to minimize forks (0.0) or random equal
participation for all permitted miners (1.0). (0 - 1)
```

Native blockchain currency (likely not required)

```
initial-block-reward = 0            # Initial block mining reward in
raw native currency units. (0 - 1000000000000000000)
first-block-reward = -1             # Different mining reward for first
block only, ignored if negative. (-1 - 1000000000000000000)
reward-halving-interval = 52560000 # Interval for halving of mining
rewards, in blocks. (60 - 1000000000)
reward-spendable-delay = 1         # Delay before mining reward can be
spent, in blocks. (1 - 100000)
minimum-per-output = 0             # Minimum native currency per
output (anti-dust), in raw units.
                                   # If set to -1, this is calculated
from minimum-relay-fee. (-1 - 1000000000)
maximum-per-output = 10000000000000 # Maximum native currency per
output, in raw units. (0 - 1000000000000000000)
minimum-relay-fee = 0               # Minimum transaction fee, per 1000
bytes, in raw units of native currency. (0 - 1000000000)
native-currency-multiple = 100000000 # Number of raw units of native
currency per display unit. (0 - 1000000000)
```

Advanced mining parameters

```
skip-pow-check = false             # Skip checking whether block
hashes demonstrate proof of work.
pow-minimum-bits = 8               # Initial and minimum proof of work
difficulty, in leading zero bits. (1 - 32)
target-adjust-freq = -1             # Interval between proof of work
difficulty adjustments, in seconds, if negative - never adjusted. (-1 -
4294967295)
allow-min-difficulty-blocks = false # Allow lower difficulty blocks if
none after 2*<target-block-time>.
```

Standard transaction definitions

```
only-accept-std-txs = true          # Only accept and relay
transactions which qualify as 'standard'.
max-std-tx-size = 4194304           # Maximum size of standard
```

```

transactions, in bytes. (1024 - 1000000000)
max-std-op-returns-count = 32          # Maximum number of OP_RETURN
metadata outputs in standard transactions. (0 - 1024)
max-std-op-return-size = 2097152       # Maximum size of OP_RETURN
metadata in standard transactions, in bytes. (0 - 67108864)
max-std-op-drops-count = 5            # Maximum number of OP_DROPS per
output in standard transactions. (0 - 100)
max-std-element-size = 8192          # Maximum size of data elements in
standard transactions, in bytes. (128 - 32768)

# The following parameters were generated by multichain-util.
# They SHOULD ONLY BE EDITED IF YOU KNOW WHAT YOU ARE DOING.

default-network-port = 7441           # Default TCP/IP port for peer-to-
peer connection with other nodes.
default-rpc-port = 7440               # Default TCP/IP port for incoming
JSON-RPC API requests.
chain-name = DemoChain                # Chain name, used as first
argument for multichainind and multichain-cli.
protocol-version = 10011             # Protocol version at the moment of
blockchain genesis.
network-message-start = fde8e5f2       # Magic value sent as the first 4
bytes of every peer-to-peer message.
address-pubkeyhash-version = 006fede8 # Version bytes used for pay-to-
pubkeyhash addresses.
address-scripthash-version = 05f4a123 # Version bytes used for pay-to-
scripthash addresses.
private-key-version = 802ff456         # Version bytes used for exporting
private keys.
address-checksum-value = 7652d476     # Bytes used for XOR in address
checksum calculation.

# The following parameters were generated by multichainind.
# They SHOULD NOT BE EDITED.

genesis-pubkey = [null]                # Genesis block coinbase output
public key.
genesis-version = [null]               # Genesis block version.
genesis-timestamp = [null]            # Genesis block timestamp.
genesis-nbits = [null]                # Genesis block difficulty (nBits).
genesis-nonce = [null]                # Genesis block nonce.
genesis-pubkey-hash = [null]          # Genesis block coinbase output
public key hash.
genesis-hash = [null]                 # Genesis block hash.
chain-params-hash = [null]            # Hash of blockchain parameters, to
prevent accidental changes.

```

Contenido de /home/devel1/.multichain/DemoChain/multichain.conf

```
rpcuser=multichainrpc
rpcpassword=2yRyYnfEZU3ENhxVcdUenLg4g2QKvYW9qjeNhwpBpa4
```

Arranque

```
devel1@VBXLFD271:~$ multichainind DemoChain -daemon
devel1@VBXLFD271:~$ multichainind DemoChain -daemon
MultiChain 1.0.6 Daemon (latest protocol 10011)
Starting up node...
Looking for genesis block...
Genesis block found
Other nodes can connect to this node using:
multichainind DemoChain@10.0.2.15:7441
This host has multiple IP addresses, so from some networks:
multichainind DemoChain@192.168.135.3:7441
multichainind DemoChain@172.23.0.1:7441
multichainind DemoChain@172.21.0.1:7441
multichainind DemoChain@172.17.0.1:7441
multichainind DemoChain@172.20.0.1:7441
Listening for API requests on port 7440 (local only - see rpcallowip
setting)
Node ready.
```

Puertos abiertos

COMMAND	PID	USER	FD	TYPE	DEVICE	SIZE/OFF	NODE	NAME
systemd-r	481	systemd-resolve	13u	IPv4	16415	0t0	TCP	
127.0.0.53:53	(LISTEN)							
cupsd	685	root	6u	IPv6	19864	0t0	TCP	[::1]:631
cupsd	685	root	7u	IPv4	19865	0t0	TCP	
127.0.0.1:631	(LISTEN)							
sshd	1296	root	3u	IPv4	27391	0t0	TCP	*:22
sshd	1296	root	4u	IPv6	27393	0t0	TCP	*:22
(LISTEN)								
multichai	3301	devel1	25u	IPv6	35428	0t0	TCP	[::1]:7440
(LISTEN)								
multichai	3301	devel1	26u	IPv4	35429	0t0	TCP	
127.0.0.1:7440	(LISTEN)							
multichai	3301	devel1	27u	IPv6	35430	0t0	TCP	*:7441
(LISTEN)								

multichai 3301 (LISTEN)	devel1	28u	IPv4	35431	0t0	TCP	*:7441
----------------------------	--------	-----	------	-------	-----	-----	--------

Log

```

devel1@VBXLFD271:~$ tail -f ~/.multichain/DemoChain/debug.log
2018-10-28 17:29:05 MultiChainMiner: Block Found -
00f8db3804c62bd767609f0be0028ddfea7690e0ae605c51c9f4873ca6f431aa, prev:
00193aef53e928b7ed36712ba0ddd38455a2f95cdf0f6908baa5b9c1846c9810, height:
14, txs: 1
2018-10-28 17:29:05 UpdateTip: new
best=00f8db3804c62bd767609f0be0028ddfea7690e0ae605c51c9f4873ca6f431aa
height=14 log2_work=11.906891 tx=15 date=2018-10-28 17:29:05
progress=1.000000 cache=0
2018-10-28 17:29:31 MultiChainMiner: Block Found -
00aea011fea5ef55f865b5f93c5959f65c0f35e2e6083d55b413b251d3d27e43, prev:
00f8db3804c62bd767609f0be0028ddfea7690e0ae605c51c9f4873ca6f431aa, height:
15, txs: 1
2018-10-28 17:29:31 UpdateTip: new
best=00aea011fea5ef55f865b5f93c5959f65c0f35e2e6083d55b413b251d3d27e43
height=15 log2_work=12 tx=16 date=2018-10-28 17:29:31 progress=1.000000
cache=0
2018-10-28 17:29:40 MultiChainMiner: Block Found -
005514d7136fd786224ca5caa5db829918f756d316d3509ca1ba9624299e1217, prev:
00aea011fea5ef55f865b5f93c5959f65c0f35e2e6083d55b413b251d3d27e43, height:
16, txs: 1
2018-10-28 17:29:40 UpdateTip: new
best=005514d7136fd786224ca5caa5db829918f756d316d3509ca1ba9624299e1217
height=16 log2_work=12.087463 tx=17 date=2018-10-28 17:29:40
progress=1.000000 cache=0
2018-10-28 17:29:56 MultiChainMiner: Block Found -
0037c1b061df479c0f82518831eb03bd81db8619ad4f2088e7fd21d674f626f2, prev:
005514d7136fd786224ca5caa5db829918f756d316d3509ca1ba9624299e1217, height:
17, txs: 1
2018-10-28 17:29:56 UpdateTip: new
best=0037c1b061df479c0f82518831eb03bd81db8619ad4f2088e7fd21d674f626f2
height=17 log2_work=12.169925 tx=18 date=2018-10-28 17:29:56
progress=1.000000 cache=0
2018-10-28 17:30:11 MultiChainMiner: Block Found -
005300075996a8260c8a6f80ecf0d43b2edcb238dfffc37d61c4b4e72011cbf, prev:
0037c1b061df479c0f82518831eb03bd81db8619ad4f2088e7fd21d674f626f2, height:
18, txs: 1
2018-10-28 17:30:11 UpdateTip: new
best=005300075996a8260c8a6f80ecf0d43b2edcb238dfffc37d61c4b4e72011cbf
height=18 log2_work=12.247928 tx=19 date=2018-10-28 17:30:11
progress=1.000000 cache=0
2018-10-28 17:30:25 MultiChainMiner: Block Found -
004fc378ac6076cc09d58bd23590abf2c6852cd618ecbc70791d5db0e50d0036, prev:
005300075996a8260c8a6f80ecf0d43b2edcb238dfffc37d61c4b4e72011cbf, height:
19, txs: 1
2018-10-28 17:30:25 UpdateTip: new
best=004fc378ac6076cc09d58bd23590abf2c6852cd618ecbc70791d5db0e50d0036
height=19 log2_work=12.321928 tx=20 date=2018-10-28 17:30:25

```

```

progress=1.000000 cache=0
2018-10-28 17:30:41 MultiChainMiner: Block Found -
005603ca9df1f155917057a5e9477257a6f0206796f800eb467e56e6b58ea241, prev:
004fc378ac6076cc09d58bd23590abf2c6852cd618ecbc70791d5db0e50d0036, height:
20, txs: 1
2018-10-28 17:30:41 UpdateTip: new
best=005603ca9df1f155917057a5e9477257a6f0206796f800eb467e56e6b58ea241
height=20 log2_work=12.392317 tx=21 date=2018-10-28 17:30:41
progress=1.000000 cache=0
2018-10-28 17:30:54 MultiChainMiner: Block Found -
008ffe065378529c7474892751b348430aeab01040e67d0fb426b57619bdcbd2, prev:
005603ca9df1f155917057a5e9477257a6f0206796f800eb467e56e6b58ea241, height:
21, txs: 1
2018-10-28 17:30:54 UpdateTip: new
best=008ffe065378529c7474892751b348430aeab01040e67d0fb426b57619bdcbd2
height=21 log2_work=12.459432 tx=22 date=2018-10-28 17:30:54
progress=1.000000 cache=0
2018-10-28 17:31:03 MultiChainMiner: Block Found -
00dc5074bafb76e672e24ccfed6c821e7870beb9dd766488b9ee3401848fca20, prev:
008ffe065378529c7474892751b348430aeab01040e67d0fb426b57619bdcbd2, height:
22, txs: 1
2018-10-28 17:31:03 UpdateTip: new
best=00dc5074bafb76e672e24ccfed6c821e7870beb9dd766488b9ee3401848fca20
height=22 log2_work=12.523562 tx=23 date=2018-10-28 17:31:03
progress=1.000000 cache=0
.....

```

Status

```

devel1@VBXLF D271:~$ multichain-cli DemoChain getinfo
{"method":"getinfo","params":[],"id":"36642015-1540748230","chain_name":"DemoChain"}

{
    "version" : "1.0.6",
    "nodeversion" : 10006901,
    "protocolverSION" : 10011,
    "chainname" : "DemoChain",
    "description" : "MultiChain DemoChain",
    "protocol" : "multichain",
    "port" : 7441,
    "setupblocks" : 60,
    "nodeaddress" : "DemoChain@10.0.2.15:7441",
    "burnaddress" : "1XXXXXXXXWwzXXXXXXXXXXXXZXXXXXXXXYxXxgu",
    "incomingpaused" : false,
    "miningpaused" : false,
    "walletversion" : 60000,
    "balance" : 0.00000000,
    "walletdbversion" : 2,
    "reindex" : false,
    "blocks" : 45,
    "timeoffset" : 0,
    "connections" : 0,
}

```

```

"proxy" : "",
"difficulty" : 0.00000006,
"testnet" : false,
"keypoololdest" : 1540747577,
"keypoolsiz" : 2,
"paytxfee" : 0.00000000,
"relayfee" : 0.00000000,
"errors" : ""

}

devel1@VBXLFD271:~$ multichain-cli DemoChain listaddresses
{"method":"listaddresses","params":[],"id":"53026272-1540750597","chain_name":"DemoChain"}

[
  {
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
    "ismine" : true
  }
]

devel1@VBXLFD271:~$ multichain-cli DemoChain getwalletinfo
{"method":"getwalletinfo","params":[],"id":"76795743-1540750784","chain_name":"DemoChain"}


{
  "walletversion" : 60000,
  "balance" : 0.00000000,
  "walletdbversion" : 2,
  "txcount" : 2,
  "utxocount" : 1,
  "keypoololdest" : 1540747577,
  "keypoolsiz" : 2
}

```

En servidor 2:

```

devel1@VBXLFD272:~$ ping 192.168.135.3
PING 192.168.135.3 (192.168.135.3) 56(84) bytes of data.
64 bytes from 192.168.135.3: icmp_seq=1 ttl=64 time=1.71 ms
64 bytes from 192.168.135.3: icmp_seq=2 ttl=64 time=4.80 ms
64 bytes from 192.168.135.3: icmp_seq=3 ttl=64 time=0.429 ms
^C
--- 192.168.135.3 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 4ms
rtt min/avg/max/mdev = 0.429/2.313/4.803/1.836 ms
devel1@VBXLFD272:~$ multichainind DemoChain@192.168.135.3:7441

MultiChain 1.0.6 Daemon (latest protocol 10011)

Retrieving blockchain parameters from the seed node 192.168.135.3:7441 ...
Blockchain successfully initialized.

```

```
Please ask blockchain admin or user having activate permission to let you
connect and/or transact:
multichain-cli DemoChain grant 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
connect
multichain-cli DemoChain grant 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
connect,send,receive
```

En Servidor 1 (granting access)

```
devel1@VBXLFD271:~$ multichain-cli DemoChain grant
1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg connect,send,receive
{"method": "grant", "params":
["1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg", "connect,send,receive"], "id": "393
30375-1540749827", "chain_name": "DemoChain"}
```

4f8364f4d01a6dd8caa535abee010ed3f46baff16e7460bbc497de8722fcfa32

En el log del servidor 1 se observó:

```
.....
2018-10-28 18:00:52 mchn: Sending minimal parameter set to
192.168.135.4:48134
2018-10-28 18:00:52 receive version message: /MultiChain:0.1.0.11/: version
70002, blocks=-1, us=192.168.135.3:7441, peer=1
2018-10-28 18:00:52 Added time data, samples 2, offset +0 (+0 minutes)
2018-10-28 18:03:47 mchn: Granting connect,send,receive permission(s) to
address 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg (0-4294967295)
2018-10-28 18:03:47 CommitTransaction:
4f8364f4d01a6dd8caa535abee010ed3f46baff16e7460bbc497de8722fcfa32, vin: 1,
vout: 2
.....
```

En Servidor 2

```
devel1@VBXLFD272:~$ tree ~/.multichain/
/home/devel1/.multichain/
└── DemoChain
    ├── db.log
    ├── debug.log
    ├── multichain.conf
    ├── params.dat
    ├── peers.dat
    ├── permissions.db
    │   ├── 000003.log
    │   ├── CURRENT
    │   ├── LOCK
    │   ├── LOG
    │   └── MANIFEST-000002
```

```

|   └── permissions.log
|   └── seed.dat
|       └── wallet.dat
└── multichain.conf

```

```
devel1@VBXLFD272:~$ more .multichain/DemoChain/multichain.conf
rpcuser=multichainrpc
rpcpassword=Fqmfvbvn5aMCa6GBQHQsVSfLoZD95svYXZDWsdiMZefKX
```

```
devel1@VBXLFD272:~$ multichainind DemoChain -daemon
```

```
MultiChain 1.0.6 Daemon (latest protocol 10011)
```

```
Starting up node...
```

```
Retrieving blockchain parameters from the seed node 192.168.135.3:7441 ...
Other nodes can connect to this node using:
multichainind DemoChain@10.0.2.15:7441
```

```
This host has multiple IP addresses, so from some networks:
```

```
multichainind DemoChain@192.168.135.4:7441
multichainind DemoChain@172.17.0.1:7441
multichainind DemoChain@172.21.0.1:7441
multichainind DemoChain@172.20.0.1:7441
multichainind DemoChain@172.23.0.1:7441
```

```
Listening for API requests on port 7440 (local only - see rpcallowip
setting)
```

```
Node ready.
```

```
devel1@VBXLFD272:~$ multichain-cli DemoChain getinfo
{"method": "getinfo", "params": [], "id": "39245477-1540750451", "chain_name": "DemoChain"}
```

```
{
  "version" : "1.0.6",
  "nodeversion" : 10006901,
  "protocolversion" : 10011,
  "chainname" : "DemoChain",
  "description" : "MultiChain DemoChain",
  "protocol" : "multichain",
  "port" : 7441,
  "setupblocks" : 60,
  "nodeaddress" : "DemoChain@10.0.2.15:7441",
  "burnaddress" : "1XXXXXXXXwzXXXXXXXXXXXXXXZXXXXXXXXYxXggu",
  "incomingpaused" : false,
  "miningpaused" : false,
  "walletversion" : 60000,
  "balance" : 0.00000000,
  "walletdbversion" : 2,
  "reindex" : false,
```

```

"blocks" : 70,
"timeoffset" : 0,
"connections" : 1,
"proxy" : "",
"difficulty" : 0.00000006,
"testnet" : false,
"keypoololdest" : 1540749651,
"keypoolsiz" : 2,
"paytxfee" : 0.00000000,
"relayfee" : 0.00000000,
"errors" : ""

}

devel1@VBXLFD272:~$ multichain-cli DemoChain listaddresses
{"method":"listaddresses","params":[],"id":"55657649-1540750554","chain_name":"DemoChain"}

[
  {
    "address" : "1QTZ9pGzuj4uTNYBKSVD3vjPvv1sTFwWw18gAg",
    "ismine" : true
  }
]

devel1@VBXLFD272:~$ multichain-cli DemoChain getwalletinfo
{"method":"getwalletinfo","params":[],"id":"53351370-1540750733","chain_name":"DemoChain"}


{
  "walletversion" : 60000,
  "balance" : 0.00000000,
  "walletdbversion" : 2,
  "txcount" : 1,
  "utxocount" : 1,
  "keypoololdest" : 1540749651,
  "keypoolsiz" : 2
}

```

Como se ven los peers entre sí

Nodo 1:

```

devel1@VBXLFD271:~$ multichain-cli DemoChain getpeerinfo
{"method":"getpeerinfo","params":[],"id":"16603727-1540750891","chain_name":"DemoChain"}


[
  {
    "id" : 3,
    "addr" : "192.168.135.4:48210",
    "addrlocal" : "192.168.135.3:7441",
    "lastseen" : 1540750891
  }
]

```

```

"services" : "00000000000000000001",
"lastsend" : 1540750889,
"lastrecv" : 1540750889,
"bytessent" : 30746,
"bytesrecv" : 8013,
"conntime" : 1540750396,
"pingtime" : 0.09119800,
"version" : 70002,
"subver" : "/MultiChain:0.1.0.11/",
"handshakelocal" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
"handshake" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
"inbound" : true,
"startingheight" : 0,
"banscore" : 0,
"synced_headers" : -1,
"synced_blocks" : -1,
"inflight" : [
],
"whitelisted" : false
}
]

```

Nodo 2:

```

devel1@VBXLFD272:~$ multichain-cli DemoChain getpeerinfo
{"method":"getpeerinfo","params":[],"id":"68294724-
1540750978","chain_name":"DemoChain"}

[
{
  "id" : 2,
  "addr" : "192.168.135.3:7441",
  "addrlocal" : "192.168.135.4:48210",
  "services" : "0000000000000001",
  "lastsend" : 1540750970,
  "lastrecv" : 1540750970,
  "bytessent" : 8525,
  "bytesrecv" : 31258,
  "conntime" : 1540750396,
  "pingtime" : 0.02663700,
  "version" : 70002,
  "subver" : "/MultiChain:0.1.0.11/",
  "handshakelocal" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
  "handshake" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
  "inbound" : false,
  "startingheight" : 70,
  "banscore" : 0,
  "synced_headers" : 70,
  "synced_blocks" : 70,
  "inflight" : [
],
  "whitelisted" : false
}
]
```

```
}
```

Parar ambos nodos

Nodo 2:

```
devel1@VBXLFD272:~$ multichain-cli DemoChain stop
{"method":"stop","params":[],"id":"14325795-
1540751382","chain_name":"DemoChain"}
```

MultiChain server stopping

```
devel1@VBXLFD272:~$ tail -f ~/.multichain/DemoChain/debug.log
2018-10-28 18:29:42 msghand thread interrupt
2018-10-28 18:29:42 dumpaddr thread stop
2018-10-28 18:29:42 opencon thread interrupt
2018-10-28 18:29:42 net thread interrupt
2018-10-28 18:29:42 Shutdown: In progress...
2018-10-28 18:29:42 RPCAcceptHandler: Error: Operation canceled
2018-10-28 18:29:42 MultiChainMiner terminated
2018-10-28 18:29:42 StopNode()
2018-10-28 18:29:42 Node stopped
2018-10-28 18:29:42 Shutdown: done
```

Nodo 1:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain stop
{"method":"stop","params":[],"id":"23258312-
1540751466","chain_name":"DemoChain"}
```

MultiChain server stopping

```
devel1@VBXLFD271:~$ tail -f ~/.multichain/DemoChain/debug.log
2018-10-28 18:31:07 net thread interrupt
2018-10-28 18:31:07 msghand thread interrupt
2018-10-28 18:31:07 addcon thread interrupt
2018-10-28 18:31:07 opencon thread interrupt
2018-10-28 18:31:07 Shutdown: In progress...
2018-10-28 18:31:07 RPCAcceptHandler: Error: Operation canceled
2018-10-28 18:31:07 MultiChainMiner terminated
2018-10-28 18:31:07 StopNode()
2018-10-28 18:31:07 Node stopped
2018-10-28 18:31:07 Shutdown: done
```

Añadir la configuración de restricción de acceso en ambos servidores

- en `~.multichain/DemoChain/params.dat`

```
rpcallowip = 192.168.135.0/24
```

```
devel1@VBXLFD271:~$ grep rpc ~/.multichain/DemoChain/params.dat
default-rpc-port = 7440          # Default TCP/IP port for incoming
JSON-RPC API requests.
rpcallowip = 192.168.135.0/24
```

```
devel1@VBXLFD272:~$ grep rpc ~/.multichain/DemoChain/params.dat
default-rpc-port = 7440          # Default TCP/IP port for incoming
JSON-RPC API requests.
rpcallowip = 192.168.135.0/24
```

NOTA Arranque adecuado:

```
multichaind DemoChain -daemon -rpcallowip=192.168.135.0/24
```

NOTA: Se han creado los siguientes **scripts** de utilidad:

startDemoChain.sh:

```
#!/bin/bash
set -x
cd $HOME && pwd
multichaind DemoChain -daemon -rpcallowip=192.168.135.0/24
multichain-cli DemoChain getinfo
tail -f $HOME/.multichain/DemoChain/debug.log
set +x
```

stopDemoChain.sh:

```
#!/bin/bash
set -x
cd $HOME && pwd
multichain-cli DemoChain stop
tail -f $HOME/.multichain/DemoChain/debug.log
set +x
```

startMultichainExplorer.sh

```
#!/bin/bash
set -x
cd $HOME/multichain-explorer && pwd && python -m Mce.abe --config
chain1.conf
set +x
```

En Nodo 1: creación de un primer **stream**

```

devel1@VBXLFD271:~$ multichain-cli DemoChain

MultiChain 1.0.6 RPC client


Interactive mode

DemoChain: create stream stream1 false

{"method":"create","params":["stream","stream1",false],"id":"89335163-1540802806","chain_name":"DemoChain"}

8c9227d484850e2ed2e8a796152aee0cc912ea0a3e987c03c7fd0e981268f985

DemoChain: gettransaction
"8c9227d484850e2ed2e8a796152aee0cc912ea0a3e987c03c7fd0e981268f985"
{"method":"gettransaction","params":
["8c9227d484850e2ed2e8a796152aee0cc912ea0a3e987c03c7fd0e981268f985"],"id":"98467376-1540803035","chain_name":"DemoChain"}


{
  "amount" : 0.00000000,
  "fee" : 0.00000000,
  "confirmations" : 11,
  "blockhash" :
"00de76417e747b2d9f2cbcd06726b4700ee63c5b1ed148850b5c268f56b995f5",
  "blockindex" : 1,
  "blocktime" : 1540802821,
  "txid" :
"8c9227d484850e2ed2e8a796152aee0cc912ea0a3e987c03c7fd0e981268f985",
  "walletconflicts" : [
    ],
  "valid" : true,
  "time" : 1540802806,
  "timereceived" : 1540802806,
  "details" : [
    {
      "account" : "",
      "address" : "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt",
      "category" : "send",
      "amount" : 0.00000000,
      "vout" : 1,
      "fee" : 0.00000000
    },
    {
      "account" : "",
      "address" : "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt",
      "category" : "receive",
      "amount" : 0.00000000,
      "vout" : 1
    }
  ],
}

```

```

"hex" :
"0100000001f526f44a430290276a0dd59bbf43bd286e624eedcb34fe7fdb04261cae2becd3
010000006b483045022100f7e13c2133e3b2cbe9c0a14c2dca165bc40fc5c1ea1cc4ba117e
dac203b787702205bb161310e8c1afc452a584c04af52c47e93ecf54e34ebdd14d1435e48df
68de0121033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8f
fffffff02000000000000000000120f73706b6e0200010773747265616d31756a00000000000000
00001976a914d9072b1912e87ed2ce281356ea00728825a5229188ac00000000"
}

```

```

DemoChain: liststreams
{"method":"liststreams","params":[],"id":"45778865-
1540803488","chain_name":"DemoChain"}

[
  {
    "name" : "root",
    "createtxid" :
"8c475ab6655be6a8582a03c1af5c952cc9847eb15db2d677b182f8564434d05d",
    "streamref" : "0-0-0",
    "open" : true,
    "details" : {
      },
    "subscribed" : true,
    "synchronized" : true,
    "items" : 2,
    "confirmed" : 2,
    "keys" : 1,
    "publishers" : 2
  },
  {
    "name" : "stream1",
    "createtxid" :
"8c9227d484850e2ed2e8a796152aee0cc912ea0a3e987c03c7fd0e981268f985",
    "streamref" : "93-266-37516",
    "open" : false,
    "details" : {
      },
    "subscribed" : false
  }
]

```

```

DemoChain: listpermissions stream1.*
{"method":"listpermissions","params":["stream1.*"],"id":"91612762-
1540803555","chain_name":"DemoChain"}

```

```

[
  {
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
    "for" : {
      "type" : "stream",
      "name" : "stream1",
      "streamref" : "93-266-37516"
    },

```

```

    "type" : "admin",
    "startblock" : 0,
    "endblock" : 4294967295
},
{
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
    "for" : {
        "type" : "stream",
        "name" : "stream1",
        "streamref" : "93-266-37516"
    },
    "type" : "activate",
    "startblock" : 0,
    "endblock" : 4294967295
},
{
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
    "for" : {
        "type" : "stream",
        "name" : "stream1",
        "streamref" : "93-266-37516"
    },
    "type" : "write",
    "startblock" : 0,
    "endblock" : 4294967295
}
]

```

DemoChain: publish stream1 key1 73747265616d2064617461

```
{"method":"publish","params": ["stream1","key1","73747265616d2064617461"],"id":"97559104-1540803681","chain_name":"DemoChain"}
```

31adbb59025e80c33e5ea5e98be7817d5a26836bd8d78b1d0bcdadbf4bc0de13

En Nodo 2:

```

DemoChain: liststreams
{"method":"liststreams","params":[],"id":"94391978-1540803881","chain_name":"DemoChain"}

[
{
    "name" : "root",
    "createtxid" :
"8c475ab6655be6a8582a03c1af5c952cc9847eb15db2d677b182f8564434d05d",
    "streamref" : "0-0-0",
    "open" : true,
    "details" : {
    },
    "subscribed" : true,

```

```

    "synchronized" : true,
    "items" : 2,
    "confirmed" : 2,
    "keys" : 1,
    "publishers" : 2
  },
  {
    "name" : "stream1",
    "createtxid" :
"8c9227d484850e2ed2e8a796152aee0cc912ea0a3e987c03c7fd0e981268f985",
    "streamref" : "93-266-37516",
    "open" : false,
    "details" : {
    },
    "subscribed" : false
  }
]
]

DemoChain: subscribe stream1
{"method":"subscribe","params":["stream1"],"id":"71986621-1540803929","chain_name":"DemoChain"}

DemoChain: liststreams
{"method":"liststreams","params":[],"id":"25926780-1540803953","chain_name":"DemoChain"}

[
  {
    "name" : "root",
    "createtxid" :
"8c475ab6655be6a8582a03c1af5c952cc9847eb15db2d677b182f8564434d05d",
    "streamref" : "0-0-0",
    "open" : true,
    "details" : {
    },
    "subscribed" : true,
    "synchronized" : true,
    "items" : 2,
    "confirmed" : 2,
    "keys" : 1,
    "publishers" : 2
  },
  {
    "name" : "stream1",
    "createtxid" :
"8c9227d484850e2ed2e8a796152aee0cc912ea0a3e987c03c7fd0e981268f985",
    "streamref" : "93-266-37516",
    "open" : false,
    "details" : {
    },
    "subscribed" : true,
    "synchronized" : true,
    "items" : 1,
    "confirmed" : 1,
    "keys" : 1,
  }
]

```

```

    "publishers" : 1
}
]
```

Nota: Ya aparece como "subscribed" : true

```
DemoChain: liststreamitems stream1
{"method":"liststreamitems","params":["stream1"],"id":"69253063-1540804053","chain_name":"DemoChain"}
```

```
[
{
    "publishers" : [
        "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],
    "key" : "key1",
    "data" : "73747265616d2064617461",
    "confirmations" : 11,
    "blocktime" : 1540803692,
    "txid" :
"31adbb59025e80c33e5ea5e98be7817d5a26836bd8d78b1d0bcdadbf4bc0de13"
}
]
```

De vuelta en Nodo 1

```
devel1@VBXLFD271:~$ multichain-cli DemoChain
```

```
MultiChain 1.0.6 RPC client
```

Interactive mode

```
DemoChain: subscribe stream1
```

```
{"method":"subscribe","params":["stream1"],"id":"65372410-1540833779","chain_name":"DemoChain"}
```

```
DemoChain: liststreamitems stream1
```

```
{"method":"liststreamitems","params":["stream1"],"id":"98878151-1540833810","chain_name":"DemoChain"}
```

```
[
{
    "publishers" : [
        "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],
    "key" : "key1",
    "data" : "73747265616d2064617461",
    "confirmations" : 11,
    "blocktime" : 1540803692,
    "txid" :
```

```

"31adbb59025e80c33e5ea5e98be7817d5a26836bd8d78b1d0bcdadbf4bc0de13"
    }
]
DemoChain: liststreamkeys stream1
{"method":"liststreamkeys", "params":["stream1"], "id":"72006247-1540833819", "chain_name":"DemoChain"}

[
  {
    "key" : "key1",
    "items" : 1,
    "confirmed" : 1
  }
]

DemoChain: grant "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" send
{"method":"grant", "params":
[["1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg", "send"], "id":"83225345-1540834009", "chain_name":"DemoChain"}  

cb2988e0e1d3cc3b1e777cd2556aa0556465364674777f9015c7b3c323778ef4  

DemoChain: grant "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" stream1.write
{"method":"grant", "params":
[["1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg", "stream1.write"], "id":"17845448-1540834033", "chain_name":"DemoChain"}  

4246d93eab9e3c6dfd5323f0feb82ff0881978e309fb71b316e37dd20eb569e3

```

En el log del Nodo 1 se puede ver:

```

2018-10-29 17:26:49 mchn: Granting send permission(s) to address
1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg (0-4294967295)
2018-10-29 17:26:49 CommitTransaction:
cb2988e0e1d3cc3b1e777cd2556aa0556465364674777f9015c7b3c323778ef4, vin: 1,
vout: 2
2018-10-29 17:27:03 MultiChainMiner: Block Found -
00efc2341bb537f482738a884d12d335248be2a3cd3ea7f538cb8642385b929e, prev:
00cbfb639c7292a2f4717a93dd2d1f7e32a481549d17dbd1986f3e5e418b08b0, height:
115, txs: 2
2018-10-29 17:27:03 UpdateTip:           new
best=00efc2341bb537f482738a884d12d335248be2a3cd3ea7f538cb8642385b929e
height=115  log2_work=14.857981  tx=122  date=2018-10-29 17:27:03
progress=1.000000  cache=0
2018-10-29 17:27:13 mchn: Granting write permission(s) to address
1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg (0-4294967295), Entity TxID:
8c9227d484850e2ed2e8a796152aee0cc912ea0a3e987c03c7fd0e981268f985, Name:
stream1
2018-10-29 17:27:13 CommitTransaction:
4246d93eab9e3c6dfd5323f0feb82ff0881978e309fb71b316e37dd20eb569e3, vin: 1,
vout: 2

```

Ahora en el Nodo 1 nuevamente (Nota: siguiendo el guión debería haberse hecho en el Nodo 2 pero, por despiste, se hizo en el nodo 1)

```
devel1@VBXLF271:~$ multichain-cli DemoChain

MultiChain 1.0.6 RPC client

Interactive mode

DemoChain: publish stream1 key1 736f6d65206f746865722064617461

{"method":"publish","params":
["stream1","key1","736f6d65206f746865722064617461"],"id":"36802476-1540834294","chain_name":"DemoChain"}

5ea4324a95a516aa110d48af18e7cc4c03907e2c02fb26fb9c3dc29d8b48c1e5

DemoChain: publish stream1 key2 53747265616d732052756c6521
{"method":"publish","params":
["stream1","key2","53747265616d732052756c6521"],"id":"67540590-1540834353","chain_name":"DemoChain"}

90ab2ae78f587069c106096c45213ebcf7baa4956a4872e9021c1434e8ecd42c
```

Ahora sí, desde el Nodo 2 vamos a introducir los siguientes mensajes:

```
HolaMundodesdeelNodo2
486f6c61204d756e646f20646573646520656c204e6f646f2032
publish stream1 key1 486f6c61204d756e646f20646573646520656c204e6f646f2032

{"saludo":"HolaMundodesdeNodo2!!!!"}
7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212
121227d
publish stream1 key2
7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212
121227d
```

```
devel1@VBXLF272:~$ multichain-cli DemoChain

MultiChain 1.0.6 RPC client

Interactive mode

DemoChain: publish stream1 key1
486f6c61204d756e646f20646573646520656c204e6f646f2032
```

```
{"method": "publish", "params": ["stream1", "key1", "486f6c61204d756e646f20646573646520656c204e6f646f2032"], "id": "46130750-1540835312", "chain_name": "DemoChain"}
```

720e5f3025ea1dc9a473b636c3e0480e0c802802ef3a7644731a49a91579b6ae

```
DemoChain: publish stream1 key2  
7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212  
121227d  
{"method": "publish", "params": ["stream1", "key2", "7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212  
121227d"], "id": "27451362-1540835405", "chain_name": "DemoChain"}
```

94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa

Now let's query the stream's contents in many different ways. Back on the first server:

- subscribe stream1
- liststreamitems stream1 (should show 5 items)

```
DemoChain: liststreamitems stream1  
{"method": "liststreamitems", "params": ["stream1"], "id": "48000687-1540835580", "chain_name": "DemoChain"}  
  
[  
  {  
    "publishers" : [  
      "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"  
    ],  
    "key" : "key1",  
    "data" : "73747265616d2064617461",  
    "confirmations" : 62,  
    "blocktime" : 1540803692,  
    "txid" :  
      "31adbb59025e80c33e5ea5e98be7817d5a26836bd8d78b1d0bcdadb4bc0de13"  
  },  
  {  
    "publishers" : [  
      "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"  
    ],  
    "key" : "key1",  
    "data" : "736f6d65206f746865722064617461",  
    "confirmations" : 39,  
    "blocktime" : 1540834306,  
    "txid" :  
      "5ea4324a95a516aa110d48af18e7cc4c03907e2c02fb26fb9c3dc29d8b48c1e5"  
  },  
  {  
    "publishers" : [  
      "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"  
    ]  
  }
```

```

    ],
    "key" : "key2",
    "data" : "53747265616d732052756c6521",
    "confirmations" : 32,
    "blocktime" : 1540834360,
    "txid" :
"90ab2ae78f587069c106096c45213ebcf7baa4956a4872e9021c1434e8ecd42c"
},
{
    "publishers" : [
        "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
    ],
    "key" : "key1",
    "data" : "486f6c61204d756e646f20646573646520656c204e6f646f2032",
    "confirmations" : 21,
    "blocktime" : 1540835333,
    "txid" :
"720e5f3025ea1dc9a473b636c3e0480e0c802802ef3a7644731a49a91579b6ae"
},
{
    "publishers" : [
        "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
    ],
    "key" : "key2",
    "data" :
"7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f20322021
2121227d",
    "confirmations" : 10,
    "blocktime" : 1540835414,
    "txid" :
"94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa"
}
]

```

MultiChain Demo – DemoChain Nodo 2

[Node](#) [Permissions](#) [Issue Asset | Update](#) [Send](#) [Create](#)

Subscribed streams

Name	root
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	2
Publishers	2

Name	stream1
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	5
Publishers	2

Other streams

MultiChain Demo – DemoChain Nodo 2

[Node](#) [Permissions](#) [Issue Asset | Update](#) [Send](#) [Create Offer | Accept](#) [Create Stream](#) [Publish](#) [View Streams](#)

Subscribed streams

Name	root
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	2
Publishers	2

Name	stream1
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	5
Publishers	2

Other streams

Stream: stream1 – 5 of 5 items

Publishers	AdminNode1 (1QZ9pgGzuj4uTNYBkSYD3yjPvv1sTfwWw18pAg)
Key	key2
Data	{"saludo": "Hola Mundo desde Nodo 2 !!!"}
Added	2018-10-29 17:50:14 GMT (confirmed)

Publishers	AdminNode1 (1QZ9pgGzuj4uTNYBkSYD3yjPvv1sTfwWw18pAg)
Key	key1
Data	Hola Mundo desde el Nodo 2
Added	2018-10-29 17:48:53 GMT (confirmed)

Publishers	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	key2
Data	Streams Rule!
Added	2018-10-29 17:32:40 GMT (confirmed)

Publishers	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	key1
Data	some other data
Added	2018-10-29 17:31:46 GMT (confirmed)

Publishers	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	key1
Data	stream data
Added	2018-10-29 09:01:32 GMT (confirmed)

- liststreamkeys stream1 (2 keys)

DemoChain: liststreamkeys stream1

```
{"method": "liststreamkeys", "params": ["stream1"], "id": "66597484-1540835646", "chain_name": "DemoChain"}
```

[

```
{
  "key" : "key1",
  "items" : 3,
  "confirmed" : 3
},
{
  "key" : "key2",
  "items" : 2,
  "confirmed" : 2
}
```

]

- liststreamkeyitems stream1 key1 (3 items with this key)

DemoChain: liststreamkeyitems stream1 key1

```
{"method": "liststreamkeyitems", "params": ["stream1", "key1"], "id": "57883759-1540835687", "chain_name": "DemoChain"}
```

[

```
{
  "publishers" : [
    "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
  ],
  "key" : "key1",
```

```

    "data" : "73747265616d2064617461",
    "confirmations" : 63,
    "blocktime" : 1540803692,
    "txid" :
"31adbb59025e80c33e5ea5e98be7817d5a26836bd8d78b1d0bcdadb4bc0de13"
},
{
  "publishers" : [
    "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt"
  ],
  "key" : "key1",
  "data" : "736f6d65206f746865722064617461",
  "confirmations" : 40,
  "blocktime" : 1540834306,
  "txid" :
"5ea4324a95a516aa110d48af18e7cc4c03907e2c02fb26fb9c3dc29d8b48c1e5"
},
{
  "publishers" : [
    "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
  ],
  "key" : "key1",
  "data" : "486f6c61204d756e646f20646573646520656c204e6f646f2032",
  "confirmations" : 22,
  "blocktime" : 1540835333,
  "txid" :
"720e5f3025ea1dc9a473b636c3e0480e0c802802ef3a7644731a49a91579b6ae"
}
]

```

Stream: stream1 – 3 of 3 items with key: key1

MultiChain Demo – DemoChain Nodo 2

Node Permissions Issue Asset | Update Send Create Offer | Accept Create Stream Publish View Streams

Subscribed streams

Name	root
Created by	AdminMaster (1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	2
Publishers	2
Name	stream1
Created by	AdminMaster (1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	5
Publishers	2

Other streams

Stream: stream1 – 3 of 3 items with key: key1

Publishers	AdminNode1 (1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg)
Key	key1
Data	Hola Mundo desde el Nodo 2
Added	2018-10-29 17:48:53 GMT (confirmed)
Publishers	AdminMaster (1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	key1
Data	some other data
Added	2018-10-29 17:31:46 GMT (confirmed)
Publishers	AdminMaster (1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	key1
Data	stream data
Added	2018-10-29 09:01:32 GMT (confirmed)

- liststreamkeyitems stream1 key2 (2 items with this key)

```

DemoChain: liststreamkeyitems stream1 key2
{"method":"liststreamkeyitems","params":["stream1","key2"],"id":"24276567-1540835762","chain_name":"DemoChain"}

[
  {
    "publishers" : [
      "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],
    "key" : "key2",
    "data" : "53747265616d732052756c6521",
    "confirmations" : 33,
    "blocktime" : 1540834360,
    "txid" :
"90ab2ae78f587069c106096c45213ebcf7baa4956a4872e9021c1434e8ecd42c"
  },
  {
    "publishers" : [
      "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
    ],
    "key" : "key2",
    "data" :
"7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f20322021
2121227d",
    "confirmations" : 11,
    "blocktime" : 1540835414,
    "txid" :
"94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa"
  }
]

```

Stream: stream1 – 2 of 2 items with key: key2

MultiChain Demo – DemoChain Nodo 2

Node Permissions Issue Asset | Update Send Create Offer | Accept Create Stream Publish View Streams

Subscribed streams

Name	root
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	2
Publishers	2
Name	stream1
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	5
Publishers	2

Stream: stream1 – 2 of 2 items with key: key2

Publishers	AdminNode1 (1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg)
Key	key2
Data	{"saludo": "Hola Mundo desde Nodo 2 !!!"}
Added	2018-10-29 17:50:14 GMT (confirmed)
Publishers	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	key2
Data	Streams Rule!
Added	2018-10-29 17:32:40 GMT (confirmed)

Other streams

- liststreampublishers stream1 (2 publishers)

```
DemoChain: liststreampublishers stream1
{"method":"liststreampublishers","params":["stream1"],"id":"68152641-1540835810","chain_name":"DemoChain"}

[
  {
    "publisher" : "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt",
    "items" : 3,
    "confirmed" : 3
  },
  {
    "publisher" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
    "items" : 2,
    "confirmed" : 2
  }
]
```

- liststreampublisheritems stream1 1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt (3 items by this publisher)

```
DemoChain: liststreampublisheritems stream1
1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt
{"method":"liststreampublisheritems","params":
["stream1","1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt"],"id":"94055884-1540835899","chain_name":"DemoChain"}

[
  {
    "publishers" : [
      "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],
    "key" : "key1",
    "data" : "73747265616d2064617461",
    "confirmations" : 63,
    "blocktime" : 1540803692,
    "txid" :
"31adbb59025e80c33e5ea5e98be7817d5a26836bd8d78b1d0bcdadb4bc0de13"
  },
  {
    "publishers" : [
      "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],
    "key" : "key1",
    "data" : "736f6d65206f746865722064617461",
    "confirmations" : 40,
    "blocktime" : 1540834306,
    "txid" :
"5ea4324a95a516aa110d48af18e7cc4c03907e2c02fb26fb9c3dc29d8b48c1e5"
  },
  {
    "publishers" : [
```

```

    "key" : "key2",
    "data" : "53747265616d732052756c6521",
    "confirmations" : 33,
    "blocktime" : 1540834360,
    "txid" :
"90ab2ae78f587069c106096c45213ebcf7baa4956a4872e9021c1434e8ecd42c"
}
]

```

Stream: stream1 – 3 of 3 items with publisher:

1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt

MultiChain Demo – DemoChain Nodo 2

[Node](#) [Permissions](#) [Issue Asset | Update](#) [Send](#) [Create Offer | Accept](#) [Create Stream](#) [Publish](#) [View Streams](#)

Subscribed streams		Stream: stream1 – 3 of 3 items with publisher: 1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	
Name	root	Publishers	AdminMaster (1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt)
Created by	AdminMaster (1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt)	Key	key2
Items	2	Data	Streams Rule!
Publishers	2	Added	2018-10-29 17:32:40 GMT (confirmed)
 		Publishers	AdminMaster (1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt)
Name	stream1	Key	key1
Created by	AdminMaster (1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt)	Data	some other data
Items	5	Added	2018-10-29 17:31:46 GMT (confirmed)
Publishers	2	Publishers	AdminMaster (1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt)
 		Key	key1
Other streams		Data	stream data
		Added	2018-10-29 09:01:32 GMT (confirmed)

- liststremapublisheritems stream1 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg (2 items by this publisher)

```

DemoChain: liststremapublisheritems stream1
1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
{"method": "liststremapublisheritems", "params":
["stream1", "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"], "id": "51751221-1540835934", "chain_name": "DemoChain"}

[
  {
    "publishers": [
      "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
    ],
    "key" : "key1",
    "data" : "486f6c61204d756e646f20646573646520656c204e6f646f2032",
    "confirmations" : 22,

```

```

    "blocktime" : 1540835333,
    "txid" :
"720e5f3025ea1dc9a473b636c3e0480e0c802802ef3a7644731a49a91579b6ae"
},
{
    "publishers" : [
        "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
    ],
    "key" : "key2",
    "data" :
"7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f20322021
2121227d",
    "confirmations" : 11,
    "blocktime" : 1540835414,
    "txid" :
"94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa"
}
]

```

Stream: stream1 – 2 of 2 items with publisher:

[1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg](#)

MultiChain Demo – DemoChain Nodo 2

Node Permissions Issue Asset | Update Send Create Offer | Accept Create Stream Publish View Streams

Subscribed streams

Name	root
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	2
Publishers	2

Name	stream1
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	5
Publishers	2

Stream: stream1 – 2 of 2 items with publisher:
[1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg](#)

Publishers	AdminNode1 (1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg)
Key	key2
Data	{"saludo": "Hola Mundo desde Nodo 2 !!!"}
Added	2018-10-29 17:50:14 GMT (confirmed)

Publishers	AdminNode1 (1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg)
Key	key1
Data	Hola Mundo desde el Nodo 2
Added	2018-10-29 17:48:53 GMT (confirmed)

Other streams

```

devel1@VBXLFD271:~$ multichain-cli DemoChain gettransaction
94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa
{"method":"gettransaction", "params":
[{"94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa"}, "id":""
14413349-1541011670", "chain_name":"DemoChain"}}

```

```

{
    "amount" : 0.00000000,
    "confirmations" : 11,
    "blockhash" :
"0095c0d85686f8bb0dbdf1659e82d65c9d498cb6f389a2f22f22a44e5239cdc4",
    "blockindex" : 1,

```

```

"blocktime" : 1540835414,
"txid" :
"94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa",
"walletconflicts" : [
],
"valid" : true,
"time" : 1540835406,
"timereceived" : 1540835406,
"details" : [
],
"hex" :

"01000000001f48e7723c3b3c715907f77744636656455a06a55d27c771e3bccd3e1e08829cb
00000006a47304402201f6566830b52d93924894b40f512820c1dd4cb67d1d18928038b48c
503632c2902204b4adef9c67a7b61888cc76f735cc7155b7c6afbe46ffb9649be7d92b61516
e0012102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddfff
fffff020000000000000000004b1473706b650cee2a1596a7e8d22e0e8584d427928c75087370
6b6b6b657932756a297b2273616c75646f223a2022486f6c61204d756e646f2064657364652
04e6f646f203220212121227d00000000000000001976a914ad9011a02cc6b7ad4a2eb01c46
e297f4dc854d0488ac00000000"
}

```

<http://localhost:2750/MultiChain%20DemoChain/tx/94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa>

Transaction 94c6e2cb69...60aa																																			
Hash	94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa																																		
Appeared in	MultiChain DemoChain, Block 156 (2018-10-29 18:50:14)																																		
Number of inputs	1 – jump to inputs																																		
Number of outputs	2 – jump to outputs																																		
Size	275 bytes																																		
Inputs <table border="1"> <thead> <tr> <th>Index</th> <th>Previous output</th> <th>Native</th> <th>From address</th> <th>ScriptSig</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>cb2988e0e1...:0</td> <td>0</td> <td>1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg</td> <td>71:3044...e001 33:02f2...73dd</td> </tr> </tbody> </table> Outputs <table border="1"> <thead> <tr> <th>Index</th> <th>Redeemed at input</th> <th>Native</th> <th>To address</th> <th>ScriptPubKey</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Not yet redeemed</td> <td>0</td> <td>None</td> <td>20:7370...928c DROP 8:7370...7932 DROP RETURN 41:7b22...227d <table border="1"> <tr> <td>Stream</td> <td>stream1</td> </tr> <tr> <td>Key</td> <td>key2</td> </tr> <tr> <td>Data</td> <td>7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212121227d</td> </tr> </table> </td> </tr> <tr> <td>1</td> <td>Not yet redeemed</td> <td>0</td> <td>1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg</td> <td>DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG</td> </tr> </tbody> </table>					Index	Previous output	Native	From address	ScriptSig	0	cb2988e0e1...:0	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	71:3044...e001 33:02f2...73dd	Index	Redeemed at input	Native	To address	ScriptPubKey	0	Not yet redeemed	0	None	20:7370...928c DROP 8:7370...7932 DROP RETURN 41:7b22...227d <table border="1"> <tr> <td>Stream</td> <td>stream1</td> </tr> <tr> <td>Key</td> <td>key2</td> </tr> <tr> <td>Data</td> <td>7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212121227d</td> </tr> </table>	Stream	stream1	Key	key2	Data	7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212121227d	1	Not yet redeemed	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG
Index	Previous output	Native	From address	ScriptSig																															
0	cb2988e0e1...:0	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	71:3044...e001 33:02f2...73dd																															
Index	Redeemed at input	Native	To address	ScriptPubKey																															
0	Not yet redeemed	0	None	20:7370...928c DROP 8:7370...7932 DROP RETURN 41:7b22...227d <table border="1"> <tr> <td>Stream</td> <td>stream1</td> </tr> <tr> <td>Key</td> <td>key2</td> </tr> <tr> <td>Data</td> <td>7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212121227d</td> </tr> </table>	Stream	stream1	Key	key2	Data	7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212121227d																									
Stream	stream1																																		
Key	key2																																		
Data	7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212121227d																																		
1	Not yet redeemed	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG																															

```
{ "hash": "94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa",
  "in": [
    {
      "prev_out": {
        "hash": "cb2988e0e1d3cc3b1e777cd2556aa0556465364674777f9015c7b3c323778ef4",
        "n": 0
      },
      "raw_scriptSig":
        "47304402201f6566830b52d93924894b40f512820c1dd4cb67d1d18928038b48c503632c2902204b4adef9c67a7b61888cc76f735cc7155b7c6afbe46ff9649be7d92b61516e0012102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718
      "sequence": 4294967295
    }
  ],
  "lock_time": 0,
  "out": [
    {
      "raw_scriptPubKey": "1473706b650cee2a1596a7e8d22e0e8584d427928c750873706b6b6b657932756a297b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f203220212121227d",
      "value": "0.0000000"
    },
    {
      "raw_scriptPubKey": "76a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac",
      "value": "0.0000000"
    }
  ],
  "size": 275,
  "ver": 1,
  "vin_sz": 1,
  "vout_sz": 2
}
```

ASSETS

En nodo 1:

Now we are going to create a new asset and send it between nodes. On the first server, get the address that has the permission to create assets:

```
DemoChain: listpermissions issue
{"method":"listpermissions","params":["issue"],"id":"25877722-1541233328","chain_name":"DemoChain"}

[
  {
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
    "for" : null,
    "type" : "issue",
    "startblock" : 0,
    "endblock" : 4294967295
  }
]
```

En nodo 2: Se produce el mismo resultado. Por ahora sólo el usuario asociado a la dirección del primer usuario (admin) que se creó al crear la Multichain por primera vez:

```
DemoChain: listpermissions issue
{"method":"listpermissions","params":["issue"],"id":"95818386-1541233467","chain_name":"DemoChain"}

[
  {
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
    "for" : null,
    "type" : "issue",
    "startblock" : 0,
    "endblock" : 4294967295
  }
]
```

En Nodo 1:

Now we'll create a new asset on this node with 1000 units, each of which can be subdivided into 100 parts, sending it to itself (GENESIS)

```
DemoChain: issue 1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt asset1 1000 0.01
{"method":"issue","params":
["1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt","asset1",1000,0.01000000],"id":"51390516-1541233776","chain_name":"DemoChain"}
```

259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c

En el Explorer

 MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Search

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	177	190	1	1	2	1	2018-10-28	5.6

Latest Transactions

Txid	Type	Confirmation	Time
259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c	Asset	11 confirmations	< 16 minutes

 Transaction 259c3624dd...816c

Hash	259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c
Appeared in	MultiChain DemoChain, Block 167 (2018-11-03 09:29:45)
Number of inputs	1 – jump to inputs
Number of outputs	3 – jump to outputs
Size	273 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

Inputs

Index	Previous output	Native	From address	ScriptSig
0	90ab2ae78f...:1	0	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt	72:3045...7a01 33:0339...43c8

Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 12:7370...0000 DROP
1	Not yet redeemed	0	None	21:7370...0000 DROP RETURN

```

8825a5229188ac00000000",
  "issue": {
    "details": {},
    "multiple": 100,
    "name": "asset1",
    "open": false,
    "type": "issuemore"
  },
  "locktime": 0,
  "time": 1541233785,
  "txid": "259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c",
  "version": 1,
  "vin": [
    {
      "scriptSig": {
        "asm": "3045022100a77130fc32bbc37429f71c2b35eb8bcd0c75ca27a67773505be437bb593d20a3
022053da97bc905b0202d80e755b0808a89e74f9e200aeb4219f679a62e647981c7a01
033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8",
        "hex": "483045022100a77130fc32bbc37429f71c2b35eb8bcd0c75ca27a67773505be437bb593d20
a3022053da97bc905b0202d80e755b0808a89e74f9e200aeb4219f679a62e647981c7a01210
33988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8"
      },
      "sequence": 4294967295,
      "txid": "90ab2ae78f587069c106096c45213ebcf7baa4956a4872e9021c1434e8ecd42c",
      "vout": 1
    }
  ],
  "vout": [
    {
      "assets": [
        {
          "assetref": "167-266-39973",
          "issuetxid": "259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c",
          "name": "asset1",
          "qty": 1000.0,
          "raw": 100000,
          "type": "issuemore"
        }
      ],
      "items": [],
      "n": 0,
      "permissions": [],
      "scriptPubKey": {
        "addresses": [
          "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
        ],
        "asm": "OP_DUP OP_HASH160 d9072b1912e87ed2ce281356ea00728825a52291
OP_EQUALVERIFY OP_CHECKSIG 73706b67a08601000000000000 OP_DROP",
        "hex": "76a914d9072b1912e87ed2ce281356ea00728825a5229188ac0c73706b67a086010000000000

```

```

0075",
    "reqSigs": 1,
    "type": "pubkeyhash"
},
    "value": 0.0
},
{
    "assets": [],
    "items": [],
    "n": 1,
    "permissions": [],
    "scriptPubKey": {
        "asm": "73706b6e0100010661737365743100410464000000 OP_DROP
OP_RETURN",
        "hex": "1573706b6e0100010661737365743100410464000000756a",
        "type": "nulldata"
},
    "value": 0.0
},
{
    "assets": [],
    "items": [],
    "n": 2,
    "permissions": [],
    "scriptPubKey": {
        "addresses": [
            "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
        ],
        "asm": "OP_DUP OP_HASH160 d9072b1912e87ed2ce281356ea00728825a52291
OP_EQUALVERIFY OP_CHECKSIG",
        "hex": "76a914d9072b1912e87ed2ce281356ea00728825a5229188ac",
        "reqSigs": 1,
        "type": "pubkeyhash"
},
    "value": 0.0
}
]
}

```

On both servers, verify that the asset named asset1 is listed:

Nodo 1:

```

DemoChain: listassets

{"method":"listassets","params":[],"id":"12565552-
1541235222","chain_name":"DemoChain"}

[
    {
        "name" : "asset1",
        "issuetxid" :

```

```
"259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c",
    "assetref" : "167-266-39973",
    "multiple" : 100,
    "units" : 0.01000000,
    "open" : false,
    "details" : {
    },
    "issueqty" : 1000.00000000,
    "issueraw" : 100000,
    "subscribed" : false
}
]
```

Nodo 2:

```
DemoChain: listassets
{"method":"listassets","params":[],"id":"11292062-
1541235232","chain_name":"DemoChain"}

[
{
    "name" : "asset1",
    "issuetxid" :
"259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c",
    "assetref" : "167-266-39973",
    "multiple" : 100,
    "units" : 0.01000000,
    "open" : false,
    "details" : {
    },
    "issueqty" : 1000.00000000,
    "issueraw" : 100000,
    "subscribed" : false
}
]
```

Now check the asset balances on each server.

Nodo 1 (The first should show a balance of 1000)

```
DemoChain: gettotalbalances
{"method":"gettotalbalances","params":[],"id":"50905125-
1541236207","chain_name":"DemoChain"}

[
{
    "name" : "asset1",
    "assetref" : "167-266-39973",
    "qty" : 1000.00000000
```

```

}
]
```

Nodo 2 (... and the second should show no assets at all)

```

DemoChain: gettotalbalances
{"method":"gettotalbalances","params":[],"id":"54473237-
1541236242","chain_name":"DemoChain"}

[
```

Help `gettotalbalances`

```

DemoChain: help gettotalbalances
{"method":"help","params":["gettotalbalances"],"id":"21347682-
1541235471","chain_name":"DemoChain"}
```

`gettotalbalances (minconf includeWatchonly includeLocked)`

Returns a list of all the asset balances `in` this node's wallet, with at least `minconf` confirmations.

Arguments:

1. `minconf` (numeric, optional, default=1) Only include transactions confirmed at least this many `times`.
2. `includeWatchonly` (bool, optional, default=false) Also include balance `in` watchonly addresses (see '`importaddress`')
3. `includeLocked` (bool, optional, default=false) Also take locked outputs into account

Result:

An array of Objects with totals and details `for` each asset.

Examples:

The total amount `in` the server across all accounts
> multichain-cli DemoChain gettotalbalances

The total amount `in` the server across all accounts, with at least 5 confirmations
> multichain-cli DemoChain gettotalbalances 6

The total amount `in` the default account with at least 1 confirmation
> multichain-cli DemoChain gettotalbalances

The total amount `in` the account named tabby with at least 6 confirmations
> multichain-cli DemoChain gettotalbalances 6 `true`

As a json rpc call

```
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id":"curltest",
2018-11-11
```

```
"method": "getttotalbalances", "params": ["tabby", 6] }' -H 'content-type: text/plain;' http://127.0.0.1:7440
```

Verifiquemos que **addresses** hay en cada servidor en este momento:

Nodo 1:

```
DemoChain: listaddresses "*" true
{"method":"listaddresses","params":["*","true"],"id":"16423526-1541236444","chain_name":"DemoChain"}

[
  {
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
    "ismine" : true,
    "iswatchonly" : false,
    "isscript" : false,
    "pubkey" :
"033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8",
    "iscompressed" : true,
    "account" : "",
    "synchronized" : true
  }
]
```

Nodo 2:

```
DemoChain: listaddresses "*" true
{"method":"listaddresses","params":["*","true"],"id":"50238082-1541236559","chain_name":"DemoChain"}

[
  {
    "address" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
    "ismine" : true,
    "iswatchonly" : false,
    "isscript" : false,
    "pubkey" :
"02f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dd",
    "iscompressed" : true,
    "account" : "",
    "synchronized" : true
  }
]
```

On the first server, now try sending 100 units of the asset to the second server's wallet:

40/193

```
DemoChain: sendasset 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg asset1 100
{"method":"sendasset", "params":
[["1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg", "asset1", 100], "id":"53138924-1541236712", "chain_name": "DemoChain"}
```

1ed3e7560da9efd012a9ae915b352c6d31f7755787992a239ad01d66397933ad

MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	188	202	1	1	2	1	2018-10-28	5.7

Latest Transactions

Txid	Type	Confirmation	Time
1ed3e7560da9efd012a9ae915b352c6d31f7755787992a239ad01d66397933ad	Asset	11 confirmations	< 7 minutes

Transaction 1ed3e7560d...33ad

Hash	1ed3e7560da9efd012a9ae915b352c6d31f7755787992a239ad01d66397933ad
Appeared in	MultiChain DemoChain, Block 178 (2018-11-03 10:18:49)
Number of inputs	1 – jump to inputs
Number of outputs	2 – jump to outputs
Size	285 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

Inputs

Index	Previous output	Native	From address	ScriptSig
0	259c3624dd...:0	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	71:3044...2201 33:0339...43c8

Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 28:7370...0000 DROP
				100.00 units of asset asset1
1	Not yet redeemed	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 28:7370...0000 DROP
				900.00 units of asset asset1

```
{
  "blockhash": "006f755a1a4cdea6ba21eb5d26b11a94f4253866f3104fbba6848184ba4bc55d",
  "blocktime": 1541236729,
  "confirmations": 11,
  "data": [],
  "hex": "01000000016c816f57f9cd91522a24e3f25a5ca95d9d2b7cece8f9dc66c3e78fdd24369c2500000006a4730440220039551d83092b7a5f312c6365e26515566c97810b935285204cc638550edf70e02207c394ef8d6a07da4ac358d08d1f73fea9dbf9a791d11a73fe42bcba1568554220121033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fff"
```

2018-11-11


```

},
  "value": 0.0
},
{
  "assets": [
    {
      "assetref": "167-266-39973",
      "issuetxid":
"259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c",
        "name": "asset1",
        "qty": 900.0,
        "raw": 90000,
        "type": "transfer"
    }
  ],
  "items": [],
  "n": 1,
  "permissions": [],
  "scriptPubKey": {
    "addresses": [
      "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],
    "asm": "OP_DUP OP_HASH160 d9072b1912e87ed2ce281356ea00728825a52291
OP_EQUALVERIFY OP_CHECKSIG
73706b719d2b7cece8f9dc66c3e78fdd24369c25905f01000000000000 OP_DROP",
    "hex":
"76a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b719d2b7cece8f9dc
66c3e78fdd24369c25905f010000000000075",
    "reqSigs": 1,
    "type": "pubkeyhash"
  },
  "value": 0.0
}
]
}

```

Now check the asset balances on each server, including transactions with zero confirmations. They should be 900 and 100 respectively:

Nodo 1:

```

DemoChain: gettotalbalances
{"method":"gettotalbalances","params":[],"id":"19291681-
1541236804","chain_name":"DemoChain"}

[
  {
    "name" : "asset1",
    "assetref" : "167-266-39973",
    "qty" : 900.00000000
  }
]

```

]

En Nodo 2:

```
DemoChain: gettotalbalances
{"method":"gettotalbalances","params":[],"id":"54311285-1541236869","chain_name":"DemoChain"}

[
  {
    "name" : "asset1",
    "assetref" : "167-266-39973",
    "qty" : 100.00000000
  }
]
```

MultiChain DemoChain

Asset Summary "asset1"

Issue Block Height	167
Issue Block Time	1541233785 (2018-11-03 09:29:45)
Issue TXID	259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c
Asset Reference	167-266-39973
Name	asset1
Addresses holding units	2 – jump to holders
Asset Issues	1 – jump to issues
Raw units issued	100000
Display quantity	1000.00
Native amount sent	0
Issuer Address	1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt
Issue Recipient Address	1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt

[MultiChain JSON](#)

Asset Issues

Txid	Issue Amount	Details
259c3624...	1000.00	

Asset Holders

Address	Balance
1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt	900.00 (transactions)
1QTZ9pGzj4uTNYBkSYD3vjPvv1sTFwWw18gAg	100.00 (transactions)

Transactions

Transaction	Block
259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c	167
1ed3e7560da9efd012a9ae915b352c6d31f7755787992a239ad01d66397933ad	178

Combining assets and streams

In this section we'll create a transaction that sends 125 units of asset1 along with some metadata written to a stream.

On the first server (Nodo 1), run:

```
DemoChain: sendwithdata 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
'{"asset1":125}' '{"for":"stream1","key":"transfer","data":"486921"}'
{"method":"sendwithdata", "params":
[{"1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg", {"asset1":125},
 {"for":"stream1","key":"transfer","data":"486921"}], "id":"15598396-1541238060", "chain_name":"DemoChain"}
```

b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c

Nota: "data":"486921"

Hex to ASCII text converter

Enter 2 digits hex numbers with any prefix / postfix / delimiter and press the *Convert* button
(e.g. 45 78 61 6d 70 6C 65 21):

486921

Convert Reset Swap

Hi!

Select

Now this transaction can be examined on the second server (Nodo 2) as below (In the output from this command, you should see the balance field showing the incoming 125 units of asset1 and the items field containing the stream item that was added.)

```

DemoChain: getwallettransaction
b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c
{"method":"getwallettransaction", "params":
[{"b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c"}, {"id": "73635868-1541238158", "chain_name": "DemoChain"}]

{
  "balance" : {
    "amount" : 0.00000000,
    "assets" : [
      {
        "name" : "asset1",
        "assetref" : "167-266-39973",
        "qty" : 125.00000000
      }
    ]
  },
  "myaddresses" : [
    "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
  ],
  "addresses" : [
    "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
  ],
  "permissions" : [
  ],
  "items" : [
    {
      "type" : "stream",
      "name" : "stream1",
      "streamref" : "93-266-37516",
      "publishers" : [
        "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
      ],
      "key" : "transfer",
      "data" : "486921"
    }
  ],
  "data" : [
    "486921"
  ],
  "confirmations" : 11,
  "blockhash" :
"00d9ee551ef424175b1db8e72518ba42a8aaaa18f87f707100ada9b3693e008b",
  "blockindex" : 1,
  "blocktime" : 1541238070,
  "txid" :
"b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c",
  "valid" : true,
  "time" : 1541238060,
  "timereceived" : 1541238060
}

```

Now check the asset balances on each server, including transactions with zero confirmations.

Nodo 1:

```
DemoChain: gettotalbalances
{"method":"gettotalbalances","params":[],"id":"48140409-
1541238339","chain_name":"DemoChain"}

[
  {
    "name" : "asset1",
    "assetref" : "167-266-39973",
    "qty" : 775.00000000
  }
]
```

En Nodo 2:

```
DemoChain: gettotalbalances
{"method":"gettotalbalances","params":[],"id":"78033514-
1541238373","chain_name":"DemoChain"}

[
  {
    "name" : "asset1",
    "assetref" : "167-266-39973",
    "qty" : 225.00000000
  }
]
```

MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	199	214	1	1	2	1	2018-10-28	5.7

Latest Transactions

Txid	Type	Confirmation	Time
b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c	Asset Stream	11 confirmations	< 8 minutes

 Transaction b1167afccb...5d5c

Hash	b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c
Appeared in	MultiChain DemoChain, Block 189 (2018-11-03 10:41:10)
Number of inputs	1 – jump to inputs
Number of outputs	3 – jump to outputs
Size	336 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

Inputs

Index	Previous output	Native	From address	ScriptSig
0	1ed3e7560d...:1	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	72:3045...e001 33:0339...43c8

Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey						
0	Not yet redeemed	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 28:7370...0000 DROP <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;">125.00 units of asset asset1</div>						
1	Not yet redeemed	0	None	20:7370...928c DROP 12:7370...6572 DROP RETURN 3:486921 <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Stream</td> <td style="padding: 2px;">stream1</td> </tr> <tr> <td style="padding: 2px;">Key</td> <td style="padding: 2px;">transfer</td> </tr> <tr> <td style="padding: 2px;">Data</td> <td style="padding: 2px;">486921</td> </tr> </table> </div>	Stream	stream1	Key	transfer	Data	486921
Stream	stream1									
Key	transfer									
Data	486921									
2	Not yet redeemed	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 28:7370...0000 DROP <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;">775.00 units of asset asset1</div>						

 MultiChain DemoChain

Asset Summary "asset1"

Issue Block Height	167
Issue Block Time	1541233785 (2018-11-03 09:29:45)
Issue TXID	259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c
Asset Reference	167-266-39973
Name	asset1
Addresses holding units	2 – jump to holders
Asset Issues	1 – jump to issues
Raw units issued	100000
Display quantity	1000.00
Native amount sent	0
Issuer Address	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt
Issue Recipient Address	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt

[MultiChain JSON](#)

Asset Issues

Txid	Issue Amount	Details
259c3624...	1000.00	

Asset Holders

Address	Balance
1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt	775.00 (transactions)
1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	225.00 (transactions)

Transactions

Transaction	Block
259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c	167
1ed3e7560da9ef012a9ae915b352c6d31f7755787992a239ad01d66397933ad	178
b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c	189

```
{
  "blockhash": "00d9ee551ef424175b1db8e72518ba42a8aeee18f87f707100ada9b3693e008b",
  "blocktime": 1541238070,
  "confirmations": 11,
  "data": [
    "486921"
  ],
  "hex": "0100000001ad337939661dd09a232a99875775f7316d2c355b91aea912d0efa90d56e7d31e010000006b483045022100e11e2faf125f82ccf379d3ceac4ef03191404998c1a363d7195f498902d17576022018710708da7b40efc279f2ffdb42d67782a4a566aece4229cfe1b10b4775dfe00121033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8ffffffffff03000000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c73706b719d2b7cece8f9dc66c3e78fdd24369c25d43000000000000075000000000000000000291473706b650cee2a1596a7e8d22e0e8584d427928c750c73706b6b7472616e73666572756a034869210000000000000000003776a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b719d2b7cece8f9dc66c3e78fdd24369c25bc2e0100000000007500000000",
  "locktime": 0,
  "time": 1541238070,
  "txid": "b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c",
  "version": 1,
  "vin": [
    {
      "scriptSig": {
        "asm": "3045022100e11e2faf125f82ccf379d3ceac4ef03191404998c1a363d7195f498902d17576022018710708da7b40efc279f2ffdb42d67782a4a566aece4229cfe1b10b4775dfe00121033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8",
        "hex": "483045022100e11e2faf125f82ccf379d3ceac4ef03191404998c1a363d7195f498902d17576022018710708da7b40efc279f2ffdb42d67782a4a566aece4229cfe1b10b4775dfe00121033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8"
      },
      "sequence": 4294967295,
    }
  ]
}
```



```

"asm": "73706b650cee2a1596a7e8d22e0e8584d427928c OP_DROP
73706b6b7472616e73666572 OP_DROP OP_RETURN 2189640",
    "hex": "1473706b650cee2a1596a7e8d22e0e8584d427928c750c73706b6b7472616e73666572756a
03486921",
        "type": "nulldata"
    },
    "value": 0.0
},
{
    "assets": [
        {
            "assetref": "167-266-39973",
            "issuetxid":
"259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c",
                "name": "asset1",
                "qty": 775.0,
                "raw": 77500,
                "type": "transfer"
            }
        ],
        "items": [],
        "n": 2,
        "permissions": [],
        "scriptPubKey": {
            "addresses": [
                "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
            ],
            "asm": "OP_DUP OP_HASH160 d9072b1912e87ed2ce281356ea00728825a52291
OP_EQUALVERIFY OP_CHECKSIG
73706b719d2b7cece8f9dc66c3e78fdd24369c25bc2e01000000000000 OP_DROP",
            "hex": "76a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b719d2b7cece8f9dc
66c3e78fdd24369c25bc2e01000000000075",
                "reqSigs": 1,
                "type": "pubkeyhash"
            },
            "value": 0.0
        }
    ]
}

```

You can also view this item directly within the stream:

Nodo 1:

```

DemoChain: liststreamitems stream1
{"method":"liststreamitems","params":["stream1"],"id":"20407900-
1541238511","chain_name":"DemoChain"}

```

[

```
{
  "publishers" : [
    "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt"
  ],
  "key" : "key1",
  "data" : "73747265616d2064617461",
  "confirmations" : 96,
  "blocktime" : 1540803692,
  "txid" :
"31adbb59025e80c33e5ea5e98be7817d5a26836bd8d78b1d0bcdadb4bc0de13"
},
{
  "publishers" : [
    "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt"
  ],
  "key" : "key1",
  "data" : "736f6d65206f746865722064617461",
  "confirmations" : 73,
  "blocktime" : 1540834306,
  "txid" :
"5ea4324a95a516aa110d48af18e7cc4c03907e2c02fb26fb9c3dc29d8b48c1e5"
},
{
  "publishers" : [
    "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt"
  ],
  "key" : "key2",
  "data" : "53747265616d732052756c6521",
  "confirmations" : 66,
  "blocktime" : 1540834360,
  "txid" :
"90ab2ae78f587069c106096c45213ebcf7baa4956a4872e9021c1434e8ecd42c"
},
{
  "publishers" : [
    "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
  ],
  "key" : "key1",
  "data" : "486f6c61204d756e646f20646573646520656c204e6f646f2032",
  "confirmations" : 55,
  "blocktime" : 1540835333,
  "txid" :
"720e5f3025ea1dc9a473b636c3e0480e0c802802ef3a7644731a49a91579b6ae"
},
{
  "publishers" : [
    "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
  ],
  "key" : "key2",
  "data" :
"7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f20322021
2121227d",
  "confirmations" : 44,
  "blocktime" : 1540835414,
  "txid" :
}
```

```
"94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa"
},
{
  "publishers" : [
    "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
  ],
  "key" : "transfer",
  "data" : "486921",
  "confirmations" : 11,
  "blocktime" : 1541238070,
  "txid" :
"b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c"
}
]
```

MultiChain Demo – DemoChain Nodo 1

Node Permissions Issue Asset | Update Send Create Offer | Accept Create Stream Publish View Streams

Subscribed streams

Name	root
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	2
Publishers	2
Name	stream1
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	6
Publishers	2

Other streams

Stream: stream1 – 6 of 6 items

Publishers	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	transfer
Data	Hola
Added	2018-11-03 09:41:10 GMT (confirmed)
Publishers	AdminNode1 (1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg)
Key	key2
Data	{"saludo": "Hola Mundo desde Nodo 2 !!!"}
Added	2018-10-29 17:50:14 GMT (confirmed)
Publishers	AdminNode1 (1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg)
Key	key1
Data	Hola Mundo desde el Nodo 2
Added	2018-10-29 17:48:53 GMT (confirmed)
Publishers	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	key2
Data	Streams Rule!
Added	2018-10-29 17:22:40 GMT (confirmed)

Nodo 2:

```
DemoChain: liststreamitems stream1
{"method":"liststreamitems","params":["stream1"],"id":"70845486-1541238559","chain_name":"DemoChain"}
```

```
[
  {
    "publishers" : [
      "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],
    "key" : "key1",
    "data" : "73747265616d2064617461",
    "confirmations" : 11,
    "blocktime" : 1541238070,
    "txid" :
"b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c"
  }
]
```

```

    "confirmations" : 96,
    "blocktime" : 1540803692,
    "txid" :
"31adbb59025e80c33e5ea5e98be7817d5a26836bd8d78b1d0bcdadbf4bc0de13"
},
{
    "publishers" : [
        "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],
    "key" : "key1",
    "data" : "736f6d65206f746865722064617461",
    "confirmations" : 73,
    "blocktime" : 1540834306,
    "txid" :
"5ea4324a95a516aa110d48af18e7cc4c03907e2c02fb26fb9c3dc29d8b48c1e5"
},
{
    "publishers" : [
        "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],
    "key" : "key2",
    "data" : "53747265616d732052756c6521",
    "confirmations" : 66,
    "blocktime" : 1540834360,
    "txid" :
"90ab2ae78f587069c106096c45213ebcf7baa4956a4872e9021c1434e8ecd42c"
},
{
    "publishers" : [
        "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
    ],
    "key" : "key1",
    "data" : "486f6c61204d756e646f20646573646520656c204e6f646f2032",
    "confirmations" : 55,
    "blocktime" : 1540835333,
    "txid" :
"720e5f3025ea1dc9a473b636c3e0480e0c802802ef3a7644731a49a91579b6ae"
},
{
    "publishers" : [
        "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
    ],
    "key" : "key2",
    "data" :
"7b2273616c75646f223a2022486f6c61204d756e646f206465736465204e6f646f20322021
2121227d",
    "confirmations" : 44,
    "blocktime" : 1540835414,
    "txid" :
"94c6e2cb6911b1010be12678b6e962373c64dbd442c286147797dd879d9260aa"
},
{
    "publishers" : [
        "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
    ],

```

```

        "key" : "transfer",
        "data" : "486921",
        "confirmations" : 11,
        "blocktime" : 1541238070,
        "txid" :
"b1167afccb4b7d1aa64ca8953d0b6f47a7752693c60890efa49de2a2f5e45d5c"
    }
]

```

MultiChain Demo – DemoChain Nodo 2

Node	Permissions	Issue Asset Update	Send	Create Offer Accept	Create Stream	Publish	View Streams
----------------------	-----------------------------	--------------------------------------	----------------------	---------------------------------------	-------------------------------	-------------------------	------------------------------

Subscribed streams

Name	root
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	2
Publishers	2

Name	stream1
Created by	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Items	6
Publishers	2

Other streams

Stream: stream1 – 6 of 6 items

Publishers	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	transfer
Data	Hil
Added	2018-11-03 09:41:10 GMT (confirmed)
Publishers	AdminNode1 (1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg)
Key	key2
Data	{"saludo": "Hola Mundo desde Nodo 2 !!!"}
Added	2018-10-29 17:50:14 GMT (confirmed)
Publishers	AdminNode1 (1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg)
Key	key1
Data	Hola Mundo desde el Nodo 2
Added	2018-10-29 17:48:53 GMT (confirmed)
Publishers	AdminMaster (1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	key2
Data	Streams Rule!
Added	2018-10-29 17:22:40 GMT (confirmed)

API REST

MultiChain JSON-RPC API commands

```
DemoChain: getblockchainparams true
```

```
{"method":"getblockchainparams","params":[true],"id":"31259191-1541358391","chain_name":"DemoChain"}
```

```
{
  "chain-protocol" : "multichain",
  "chain-description" : "MultiChain DemoChain",
  "root-stream-name" : "root",
  "root-stream-open" : true,
  "chain-is-testnet" : false,
  "target-block-time" : 15,
  "maximum-block-size" : 8388608,
  "default-network-port" : 7441,
```

```

"default-rpc-port" : 7440,
"anyone-can-connect" : false,
"anyone-can-send" : false,
"anyone-can-receive" : false,
"anyone-can-receive-empty" : true,
"anyone-can-create" : false,
"anyone-can-issue" : false,
"anyone-can-mine" : false,
"anyone-can-activate" : false,
"anyone-can-admin" : false,
"support-miner-precheck" : true,
"allow-arbitrary-outputs" : false,
"allow-p2sh-outputs" : true,
"allow-multisig-outputs" : true,
"setup-first-blocks" : 60,
"mining-diversity" : 0.30000000,
"admin-consensus-upgrade" : 0.50000000,
"admin-consensus-admin" : 0.50000000,
"admin-consensus-activate" : 0.50000000,
"admin-consensus-mine" : 0.50000000,
"admin-consensus-create" : 0.00000000,
"admin-consensus-issue" : 0.00000000,
"lock-admin-mine-rounds" : 10,
"mining-requires-peers" : true,
"mine-empty-rounds" : 10.00000000,
"mining-turnover" : 0.50000000,
"first-block-reward" : -1,
"initial-block-reward" : 0,
"reward-halving-interval" : 52560000,
"reward-spendable-delay" : 1,
"minimum-per-output" : 0,
"maximum-per-output" : 1000000000000000,
"minimum-relay-fee" : 0,
"native-currency-multiple" : 100000000,
"skip-pow-check" : false,
"pow-minimum-bits" : 8,
"target-adjust-freq" : -1,
"allow-min-difficulty-blocks" : false,
"only-accept-std-txs" : true,
"max-std-tx-size" : 4194304,
"max-std-op-returns-count" : 32,
"max-std-op-return-size" : 2097152,
"max-std-op-drops-count" : 5,
"max-std-element-size" : 8192,
"chain-name" : "DemoChain",
"protocol-version" : 10011,
"network-message-start" : "fde8e5f2",
"address-pubkeyhash-version" : "006fede8",
"address-scripthash-version" : "05f4a123",
"private-key-version" : "802ff456",
"address-checksum-value" : "7652d476",
"genesis-pubkey" :
"033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8",
"genesis-version" : 1,
"genesis-timestamp" : 1540747577,

```

```

"genesis-nbits" : 536936447,
"genesis-nonce" : 201,
"genesis-pubkey-hash" : "d9072b1912e87ed2ce281356ea00728825a52291",
"genesis-hash" :
"00375d5ff8fec14d6dd3f6417e34aa050c42eb8ec0540f78df8f235a48a97586",
"chain-params-hash" :
"3e72b83375284cccd53b17b7af4a17a72d5baf74433d9ccb8120e8f7bddf7c523"
}
DemoChain: help getblockchainparams
{"method":"help","params":["getblockchainparams"],"id":"18388958-1541358412","chain_name":"DemoChain"}

```

`getblockchainparams (displaynames with-upgrades)`

Returns a list of values of this blockchain's parameters

Arguments:

- 1. `displaynames` (boolean, optional, default=true) use display names instead of internal
- 2. `with-upgrades` (boolean, optional, default=true) Take upgrades into account

Result:

An object containing various blockchain parameters.

Examples:

```

> multichain-cli DemoChain getblockchainparams
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id":"curltest", "method": "getblockchainparams", "params": [] }' -H 'content-type: text/plain;' http://127.0.0.1:7440

```

```

devel1@VBXLF271:~$ more .multichain/DemoChain/multichain.conf
rpcuser=multichainrpc
rpcpassword=2yRyYnfEZU3ENhxVcdUenLg4g2QKvYW9qjeNhwpBpa4
rpcport=7440

```

```

devel1@VBXLF271:~/multichain/DemoChain$ curl --verbose --user multichainrpc:2yRyYnfEZU3ENhxVcdUenLg4g2QKvYW9qjeNhwpBpa4 --data-binary '{"jsonrpc": "1.0", "id":"curltest", "method": "getblockchainparams", "params": [] }' -H 'content-type: text/plain;' http://127.0.0.1:7440
* Rebuilt URL to: http://127.0.0.1:7440/
*   Trying 127.0.0.1...
* TCP_NODELAY set
* Connected to 127.0.0.1 (127.0.0.1) port 7440 (#0)
* Server auth using Basic with user 'multichainrpc'
> POST / HTTP/1.1
> Host: 127.0.0.1:7440
> Authorization: Basic bXVsG1jaGFpbnJwYzoyeVJ5WW5mRVpVM0V0aHhWY2RVZW5MZZRnM1FLd1lX0XFqZU5od3ZwQnBhNA==

```

```

> User-Agent: curl/7.61.0
> Accept: /*
> content-type: text/plain;
> Content-Length: 83
>
* upload completely sent off: 83 out of 83 bytes
< HTTP/1.1 200 OK
< Date: Sun, 04 Nov 2018 19:10:52 +0000
< Connection: close
< Content-Length: 2193
< Content-Type: application/json
< Server: bitcoin-json-rpc/v0.10.0.0-unk
<
{"result": {"chain-protocol": "multichain", "chain-description": "MultiChain DemoChain", "root-stream-name": "root", "root-stream-open": true, "chain-is-testnet": false, "target-block-time": 15, "maximum-block-size": 8388608, "default-network-port": 7441, "default-rpc-port": 7440, "anyone-can-connect": false, "anyone-can-send": false, "anyone-can-receive": false, "anyone-can-receive-empty": true, "anyone-can-create": false, "anyone-can-issue": false, "anyone-can-mine": false, "anyone-can-activate": false, "anyone-can-admin": false, "support-miner-precheck": true, "allow-arbitrary-outputs": false, "allow-p2sh-outputs": true, "allow-multisig-outputs": true, "setup-first-blocks": 60, "mining-diversity": 0.30000000, "admin-consensus-upgrade": 0.50000000, "admin-consensus-admin": 0.50000000, "admin-consensus-activate": 0.50000000, "admin-consensus-mine": 0.50000000, "admin-consensus-create": 0.00000000, "admin-consensus-issue": 0.00000000, "lock-admin-mine-rounds": 10, "mining-requires-peers": true, "mine-empty-rounds": 10.00000000, "mining-turnover": 0.50000000, "first-block-reward": -1, "initial-block-reward": 0, "reward-halving-interval": 52560000, "reward-spendable-delay": 1, "minimum-per-output": 0, "maximum-per-output": 1000000000000000, "minimum-relay-fee": 0, "native-currency-multiple": 100000000, "skip-pow-check": false, "pow-minimum-bits": 8, "target-adjust-freq": -1, "allow-min-difficulty-blocks": false, "only-accept-std-txs": true, "max-std-tx-size": 4194304, "max-std-op-returns-count": 32, "max-std-op-return-size": 2097152, "max-std-op-drops-count": 5, "max-std-element-size": 8192, "chain-name": "DemoChain", "protocol-version": 10011, "network-message-start": "fde8e5f2", "address-pubkeyhash-version": "006fede8", "address-scripthash-version": "05f4a123", "private-key-version": "802ff456", "address-checksum-value": "7652d476", "genesis-pubkey": "033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8", "genesis-version": 1, "genesis-timestamp": 1540747577, "genesis-nbits": 536936447, "genesis-nonce": 201, "genesis-pubkey-hash": "d9072b1912e87ed2ce281356ea00728825a52291", "genesis-hash": "00375d5ff8fec14d6dd3f6417e34aa050c42eb8ec0540f78df8f235a48a97586", "chain-params-hash": "3e72b83375284cccd53b17b7af4a17a72d5baf74433d9cbb8120e8f7bddf7c523"}, "error": null, "id": "curltest"}
* Closing connection 0

```

```
{
  "error": null,
  "id": "curltest",
  "result": {
    "address-checksum-value": "7652d476",
    "address-pubkeyhash-version": "006fede8",
    "address-scripthash-version": "05f4a123",
    "admin-consensus-activate": 0.5,
    "admin-consensus-admin": 0.5,
    "admin-consensus-create": 0.0,
    "admin-consensus-issue": 0.0,
    "admin-consensus-mine": 0.5,
    "admin-consensus-upgrade": 0.5,
    "allow-arbitrary-outputs": false,
    "allow-min-difficulty-blocks": false,
    "allow-multisig-outputs": true,
    "allow-p2sh-outputs": true,
    "anyone-can-activate": false,
    "anyone-can-admin": false,
    "anyone-can-connect": false,
    "anyone-can-create": false,
    "anyone-can-issue": false,
    "anyone-can-mine": false,
    "anyone-can-receive": false,
    "anyone-can-receive-empty": true,
    "anyone-can-send": false,
    "chain-description": "MultiChain DemoChain",
    "chain-is-testnet": false,
    "chain-name": "DemoChain",
    "chain-params-hash": "3e72b83375284cccd53b17b7af4a17a72d5baf74433d9cbb8120e8f7bddf7c523",
    "chain-protocol": "multichain",
    "default-network-port": 7441,
    "default-rpc-port": 7440,
    "first-block-reward": -1,
    "genesis-hash": "00375d5ff8fec14d6dd3f6417e34aa050c42eb8ec0540f78df8f235a48a97586",
    "genesis-nbits": 536936447,
    "genesis-nonce": 201,
    "genesis-pubkey": "033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8",
    "genesis-pubkey-hash": "d9072b1912e87ed2ce281356ea00728825a52291",
    "genesis-timestamp": 1540747577,
    "genesis-version": 1,
    "initial-block-reward": 0,
    "lock-admin-mine-rounds": 10,
    "max-std-element-size": 8192,
    "max-std-op-drops-count": 5,
    "max-std-op-return-size": 2097152,
    "max-std-op-returns-count": 32,
    "max-std-tx-size": 4194304,
    "maximum-block-size": 8388608,
    "maximum-per-output": 1000000000000000,
    "mine-empty-rounds": 10.0,
    "minimum-per-output": 0,
  }
}
```

```

    "minimum-relay-fee": 0,
    "mining-diversity": 0.3,
    "mining-requires-peers": true,
    "mining-turnover": 0.5,
    "native-currency-multiple": 1000000000,
    "network-message-start": "fde8e5f2",
    "only-accept-std-txs": true,
    "pow-minimum-bits": 8,
    "private-key-version": "802ff456",
    "protocol-version": 10011,
    "reward-halving-interval": 52560000,
    "reward-spendable-delay": 1,
    "root-stream-name": "root",
    "root-stream-open": true,
    "setup-first-blocks": 60,
    "skip-pow-check": false,
    "support-miner-precheck": true,
    "target-adjust-freq": -1,
    "target-block-time": 15
  }
}

```

HELP API

```

DemoChain: help
{"method":"help","params":[],"id":"61813011-1541360334","chain_name":"DemoChain"}

== Blockchain ==
getbestblockhash
getblock "hash"|height ( verbose )
getblockchaininfo
getblockcount
getblockhash index
getchaintips
getdifficulty
getmempoolinfo
getrawmempool ( verbose )
gettxout "txid" n ( includemempool )
gettxoutsetinfo
listassets ( asset-identifier(s) verbose count start )
listblocks block-set-identifier ( verbose )
listpermissions ( "permission(s)" address(es) verbose )
liststreams ( stream-identifier(s) verbose count start )
listupgrades (upgrade-identifier(s))
verifychain ( checklevel numblocks )

== Control ==
clearmempool
getblockchainparams ( displaynames with-upgrades )
getinfo
getruntimeparams
help ( command )

```

```

pause "task(s)"
resume "task(s)"
setlastblock ( "hash"|height )
setruntimeparam "parameter-name" parameter-value
stop

== Generating ==
getgenerate
gethashespersec
setgenerate generate ( genproclimit )

== Mining ==
getblocktemplate ( "jsonrequestobject" )
getmininginfo
getnetworkhashps ( blocks height )
prioritisettransaction txid priority-delta fee-delta
submitblock hexdata ( "jsonparametersobject" )

== Network ==
addnode "node" "add"|"remove"|"onetry"
getaddednodeinfo dns ( "node" )
getconnectioncount
getnettotals
getnetworkinfo
getpeerinfo
ping

== Rawtransactions ==
appendrawchange "tx-hex" "address" ( native-fee )
appendrawdata tx-hex data-hex|object
appendrawtransaction "tx-hex" [{"txid":"id","vout":n},...]
{"address":amount,...} [data] "action"
createrawtransaction [{"txid":"id","vout":n},...]
{"address":amount,...} ([data] "action")
decoderawtransaction "tx-hex"
decodescript script-hex
getrawtransaction "txid" ( verbose )
sendrawtransaction "tx-hex" ( allowhighfees )
signrawtransaction "tx-hex" (
[{"txid":"id","vout":n,"scriptPubKey":"hex","redeemScript":"hex"},...]
["privatekey1",...] sighashtype )

== Util ==
createkeypairs ( count )
createmultisig nrequired keys
estimatefee nblocks
estimatepriority nblocks
validateaddress "address"|"pubkey"|"privkey"
verifymessage "address" "signature" "message"

== Wallet ==
addmultisigaddress nrequired keys ( "account" )
appendrawexchange "hex" "txid" vout ask-assets
approvefrom "from-address" "upgrade-identifier" ( approve )
backupwallet "destination"

```

```

combineunspent ( "address(es)" minconf maxcombines mininputs maxinputs
maxtime )
completerawexchange hex txid vout ask-assets ( "data-hex"|object )
create "entity-type" "entity-name" open ( custom-fields )
createfrom "from-address" "entity-type" "entity-name" open ( custom-fields
)
createrawexchange "txid" vout ask-assets
createrawsendfrom "from-address" {"address":amount,...} ( [data] "action" )
decoderawexchange "tx-hex" ( verbose )
disablerawtransaction "tx-hex"
dumpprivatekey "address"
dumpwallet "filename"
encryptwallet "passphrase"
getaccount "address"
getaccountaddress "account"
getaddressbalances "address" ( minconf includeLocked )
getaddresses ( verbose )
getaddressesbyaccount "account"
getaddressestransaction "address" "txid" ( verbose )
getassetbalances ( "account" minconf includeWatchonly includeLocked )
getassettransaction "asset-identifier" "txid" ( verbose )
getbalance ( "account" minconf includeWatchonly )
getmultibalances ( address(es) assets minconf includeLocked
includeWatchonly )
getnewaddress ( "account" )
getrawchangeaddress
getreceivedbyaccount "account" ( minconf )
getreceivedbyaddress "address" ( minconf )
getstreamitem "stream-identifier" "txid" ( verbose )
getttotalbalances ( minconf includeWatchonly includeLocked )
gettransaction "txid" ( includeWatchonly )
gettxoutdata "txid" vout ( count-bytes start-byte )
getunconfirmedbalance
getwalletinfo
getwallettransaction "txid" ( includeWatchonly verbose )
grant "address(es)" "permission(s)" ( native-amount startblock endblock
"comment" "comment-to" )
grantfrom "from-address" "to-address(es)" "permission(s)" ( native-amount
startblock endblock "comment" "comment-to" )
grantwithdata "address(es)" "permission(s)" "data-hex"|object ( native-
amount startblock endblock )
grantwithdatafrom "from-address" "to-address(es)" "permission(s)" "data-
hex"|object ( native-amount startblock endblock )
importaddress address(es) ( "label" rescan )
importprivkey pubkey(s) ( "label" rescan )
importwallet "filename" ( rescan )
issue "address" "asset-name"|asset-params quantity ( smallest-unit native-
amount custom-fields )
issuefrom "from-address" "to-address" "asset-name"|asset-params quantity (
smallest-unit native-amount custom-fields )
issuemore "address" "asset-identifier" quantity ( native-amount custom-
fields )
issuemorefrom "from-address" "to-address" "asset-identifier" quantity (
native-amount custom-fields )
keypoolrefill ( newsize )

```

```

listaccounts ( minconf includeWatchonly)
listaddresses ( address(es) verbose count start )
listaddressgroupings
listaddressestransactions "address" ( count skip verbose )
listassettransactions "asset-identifier" ( verbose count start local-
ordering )
listlockunspent
listreceivedbyaccount ( minconf includeempty includeWatchonly )
listreceivedbyaddress ( minconf includeempty includeWatchonly )
listsinceblock ( blockhash target-confirmations includewatchonly )
liststreamblockitems "stream-identifier" block-set-identifier ( verbose
count start )
liststreamitems "stream-identifier" ( verbose count start local-ordering )
liststreamkeyitems "stream-identifier" "key" ( verbose count start local-
ordering )
liststreamkeys "stream-identifier" ( key(s) verbose count start local-
ordering )
liststampapublisheritems "stream-identifier" "address" ( verbose count
start local-ordering )
liststampapublishers "stream-identifier" ( address(es) verbose count start
local-ordering )
listtransactions ( "account" count from includewatchonly )
listunspent ( minconf maxconf addresses )
listwallettransactions ( count skip includewatchonly verbose )
lockunspent unlock [{"txid":"txid","vout":n},...]
move "fromaccount" "toaccount" amount ( minconf "comment" )
preparelockunspent asset-quantities ( lock )
preparelockunspentfrom "from-address" asset-quantities ( lock )
publish "stream-identifier" "key" "data-hex"
publishfrom "from-address" "stream-identifier" "key" "data-hex"
resendwallettransactions
revoke "address(es)" "permission(s)" ( native-amount "comment" "comment-to"
)
revokefrom "from-address" "to-address(es)" "permission(s)" ( native-amount
"comment" "comment-to" )
send "address" amount|asset-quantities ( "comment" "comment-to" )
sendasset "address" "asset-identifier" asset-qty ( native-amount "comment"
"comment-to" )
sendassetfrom "from-address" "to-address" "asset-identifier" asset-qty ((
native-amount "comment" "comment-to" )
sendfrom "from-address" "to-address" amount|asset-quantities ( "comment"
"comment-to" )
sendfromaccount "fromaccount" toaddress amount ( minconf "comment"
"comment-to" )
sendmany "fromaccount" {"address":amount,...} ( minconf "comment" )
sendwithdata "address" amount|asset-quantities "data-hex"|object
sendwithdatafrom "from-address" "to-address" amount|asset-quantities "data-
hex"|object
setaccount "address" "account"
settxfee amount
signmessage "address"|"privkey" "message"
subscribe entity-identifier(s) ( rescan )
unsubscribe entity-identifier(s)
walletlock

```

```
walletpassphrase "passphrase" timeout
walletpassphrasechange "oldpassphrase" "newpassphrase"
```

Nuevas direcciones

DemoChain: `help getnewaddress`
`{"method": "help", "params": ["getnewaddress"], "id": "50446007-1541359734", "chain_name": "DemoChain"}`

`getnewaddress ("account")`

Returns a new address `for` receiving payments.

If `'account'` is specified (deprecated), it is added to the address book so payments received with the address will be credited to `'account'`.

Arguments:

1. `"account"` (string, optional) The account name `for` the address to be linked to.
If not provided, the default account `""` is used.
It can also be `set` to the empty string `""` to represent the default account.
The account does not need to exist, it will be created `if` there is no account by the given name.

Result:

`"address"` (string) The new address

Examples:

```
> multichain-cli DemoChain getnewaddress
> multichain-cli DemoChain getnewaddress ""
> multichain-cli DemoChain getnewaddress "myaccount"
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id": "curltest", "method": "getnewaddress", "params": ["myaccount"] }' -H 'content-type: text/plain;' http://127.0.0.1:7440
```

DemoChain: `getnewaddress "Cuenta#1"`
`{"method": "getnewaddress", "params": ["Cuenta#1"], "id": "42240681-1541360007", "chain_name": "DemoChain"}`

error code: -702

error message:

Accounts are not supported with scalable wallet - `if` you need accounts, run

`multichaind -walletdbversion=1 -rescan`, but the wallet will perform worse

DemoChain: `getnewaddress`

`{"method": "getnewaddress", "params": [], "id": "66527934-1541360031", "chain_name": "DemoChain"}`

`18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT`

DemoChain: `listaddresses`

`{"method": "listaddresses", "params": [], "id": "39844356-`

```
1541360083", "chain_name": "DemoChain"}
```

```
[  
  {  
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",  
    "ismine" : true  
  },  
  {  
    "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",  
    "ismine" : true  
  }  
]
```

```
DemoChain: listaddresses "*" true  
{ "method": "listaddresses", "params": ["*", true], "id": "67434186-  
1541361147", "chain_name": "DemoChain"}
```

```
[  
  {  
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",  
    "ismine" : true,  
    "iswatchonly" : false,  
    "isscript" : false,  
    "pubkey" :  
"033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8",  
    "iscompressed" : true,  
    "account" : "",  
    "synchronized" : true  
  },  
  {  
    "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",  
    "ismine" : true,  
    "iswatchonly" : false,  
    "isscript" : false,  
    "pubkey" :  
"03c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9f",  
    "iscompressed" : true,  
    "account" : "",  
    "synchronized" : true  
  }  
]
```

```
DemoChain: dumpprivatekey "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"  
{ "method": "dumpprivatekey", "params":  
["18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"], "id": "57131496-  
1541360727", "chain_name": "DemoChain"}
```

```
VGeuMb2J2JMkKHBr7BCWTFkKED3RCKCFYhCUNux3wqqJFttLG6jtT5ci
```

MultiChain Demo – DemoChain Nodo 1

[Node](#) [Permissions](#) [Issue Asset | Update](#) [Send](#) [Create Offer | Accept](#) [Create Stream](#) [Publish](#) [View Streams](#)

My Node

Name	DemoChain
Version	1.0.6
Protocol	10011
Node address	DemoChain@10.0.2.15:7441
Blocks	199
Peers	1

Connected Nodes

Node IP address	192.168.135.4
Handshake address	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
Latency	0.001 sec

My Addresses

Label	AdminMaster – change label
Address	IWLH5hAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt
Permissions	connect, send, receive, issue, create, mine, admin, activate – change
Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Permissions	none (cannot set label) – change

[Get new address](#)

MultiChain Demo – DemoChain Nodo 1

Node	Permissions	Issue Asset Update	Send	Create Offer Accept	Create Stream	Publish	View Streams
----------------------	-----------------------------	--------------------------------------	----------------------	---------------------------------------	-------------------------------	-------------------------	------------------------------

Current Permissions

Label	AdminMaster
Address	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt (local)
Permissions	mine, admin, activate, connect, send, receive, issue, create
Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT (local)
Permissions	none
Label	AdminNode1
Address	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
Permissions	connect, send, receive

Change Permissions

Admin address: AdminMaster (1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt, l)

For address: 18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT

Operation: Grant Revoke

Permissions:

<input checked="" type="checkbox"/> Connect	<input checked="" type="checkbox"/> Send	<input checked="" type="checkbox"/> Receive	<input checked="" type="checkbox"/> Create
<input checked="" type="checkbox"/> Issue	<input type="checkbox"/> Mine	<input type="checkbox"/> Activate	<input type="checkbox"/> Admin

Change Permissions

MultiChain Demo – DemoChain Nodo 1

Node	Permissions	Issue Asset Update	Send	Create Offer Accept	Create Stream	Publish	View Streams
----------------------	-----------------------------	--------------------------------------	----------------------	---------------------------------------	-------------------------------	-------------------------	------------------------------

Permissions successfully changed in transaction fb3af141049bd5071523303c8e3d58329a5991d4fac9eb2e764a1382a4ac3723

Current Permissions

Label	AdminMaster
Address	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt (local)
Permissions	mine, admin, activate, connect, send, receive, issue, create
Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT (local)
Permissions	connect, send, receive, create, issue
Label	AdminNode1
Address	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
Permissions	connect, send, receive

Change Permissions

Admin address: AdminMaster (1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt, l)

For address: 18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT

Operation: Grant Revoke

Permissions:

<input type="checkbox"/> Connect	<input type="checkbox"/> Send	<input type="checkbox"/> Receive	<input type="checkbox"/> Create
<input type="checkbox"/> Issue	<input type="checkbox"/> Mine	<input type="checkbox"/> Activate	<input type="checkbox"/> Admin

Change Permissions

MultiChain Demo – DemoChain Nodo 1

[Node](#) [Permissions](#) [Issue Asset | Update](#) [Send](#) [Create Offer | Accept](#) [Create Stream](#) [Publish](#) [View Streams](#)

My Node

Name	DemoChain
Version	1.0.6
Protocol	10011
Node address	DemoChain@10.0.2.15:7441
Blocks	201
Peers	1

My Addresses

Label	AdminMaster – change label
Address	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
Permissions	connect, send, receive, issue, create, mine, admin, activate – change
Label	Set label
Address	18vsVGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Permissions	connect, send, receive, issue, create – change

Connected Nodes

Node IP address	192.168.135.4
Handshake address	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
Latency	0.056 sec

[Get new address](#)

How to set address labels



How to set address labels via the API, this is in the php multichain demo? When looking at an address you are able to change labels for each address.

[address](#) [label](#) [php](#) [multichain-web-demo](#)

[asked Aug 28, 2017 by RobertJ](#)
[flag](#) [Answer](#) [comment](#)

2 Answers



I believe its PublishFrom.


[answered Aug 28, 2017 by MaSsv](#)
[flag](#) [ask related question](#) [comment](#)


There is no fixed mechanism for address labels. The Web Demo uses the root stream for them, with the publisher as the proven source of the label, but you're welcome to use a different stream or mechanism.


[answered Aug 28, 2017 by MultiChain](#)

MultiChain Demo – DemoChain Nodo 1

[Node](#) [Permissions](#) [Issue Asset | Update](#) [Send](#) [Create Offer | Accept](#) [Create Stream](#) [Publish](#) [View Streams](#)

Set address label

For address:	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Label:	NewAddress01
Set Label	

MultiChain Demo – DemoChain Nodo 1

[Node](#) [Permissions](#) [Issue Asset | Update](#) [Send](#) [Create Offer | Accept](#) [Create Stream](#) [Publish](#) [View Streams](#)

Label successfully updated in transaction 397ed4a3dbbb78490680656004a1d9bf36a92d0ab317e5112aab5ef618fe5fd1

Set address label

For address:	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Label:	NewAddress01
Set Label	

MultiChain Demo – DemoChain Nodo 1

[Node](#) [Permissions](#) [Issue Asset | Update](#) [Send](#) [Create Offer | Accept](#) [Create Stream](#) [Publish](#) [View Streams](#)

My Node

Name	DemoChain
Version	1.0.6
Protocol	10011
Node address	DemoChain@10.0.2.15:7441
Blocks	208
Peers	1

My Addresses

Label	AdminMaster – change label
Address	1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt
Permissions	connect, send, receive, issue, create, mine, admin, activate – change
Label	NewAddress01 – change label
Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Permissions	connect, send, receive, issue, create – change

Connected Nodes

Node IP address	192.168.135.4
Handshake address	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
Latency	0.023 sec

[Get new address](#)

 MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	211	228	1	2	2	1	2018-10-28	7.1

Latest Transactions

Txid	Type	Confirmation	Time
397ed4a3dbbb78490680656004a1d9bf36a92d0ab317e5112aab5ef618fe5fd1	Stream	7 confirmations	< 1 minutes

Transaction 397ed4a3db...5fd1

Hash	397ed4a3dbbb78490680656004a1d9bf36a92d0ab317e5112aab5ef618fe5fd1
Appeared in	MultiChain DemoChain, Block 206 (2018-11-04 20:57:05)
Number of inputs	1 – jump to inputs
Number of outputs	2 – jump to outputs
Size	243 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

Inputs

Index	Previous output	Native	From address	ScriptSig
0	fb3af14104...:0	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	72:3045...5701 33:03c1...8e9f

Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey						
0	Not yet redeemed	0	None	20:7370...478c DROP 4:73706b6b DROP RETURN 12:4e65...3031						
				<table border="1"> <tr> <td>Stream</td> <td>root</td> </tr> <tr> <td>Key</td> <td></td> </tr> <tr> <td>Data</td> <td>4e6577416464726573733031</td> </tr> </table>	Stream	root	Key		Data	4e6577416464726573733031
Stream	root									
Key										
Data	4e6577416464726573733031									
1	Not yet redeemed	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG						

Hex to ASCII text converter

Enter 2 digits hex numbers with any prefix / postfix / delimiter and press the *Convert* button
(e.g. 45 78 61 6d 70 6C 65 21):

Convert
 Reset
 Swap

Select

MultiChain Demo – DemoChain Nodo 1

[Node](#)
[Permissions](#)
[Issue Asset | Update](#)
[Send](#)
[Create Offer | Accept](#)
[Create Stream](#)
[Publish](#)
[View Streams](#)

Subscribed streams

Name	root
Created by	AdminMaster (1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uo uf39qHt)
Items	3
Publishers	3

Name	stream1
Created by	AdminMaster (1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uo uf39qHt)
Items	6
Publishers	2

Stream: root – 3 of 3 items

Publishers	NewAddress01 (18vsVGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT)
Key	
Data	NewAddress01
Added	2018-11-04 19:57:05 GMT (confirmed)

Publishers	AdminNode1 (1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg)
Key	
Data	AdminNode1
Added	2018-10-29 08:43:53 GMT (confirmed)

Publishers	AdminMaster (1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	
Data	AdminMaster
Added	2018-10-29 08:40:34 GMT (confirmed)

Other streams

Publishers	AdminMaster (1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt)
Key	
Data	AdminMaster
Added	2018-10-29 08:40:34 GMT (confirmed)

Nota: Importante: no se genera una nueva entrada en `multichain.conf`

```
devel1@VXLFD271:~$ more .multichain/DemoChain/multichain.conf
rpcuser=multichainrpc
rpcpassword=2yRyYnfEZU3ENhxVcdUenLg4g2QKvYW9qjeNhwpBpa4
rpcport=7440
```

Asset reissuance

Multi-stage asset creation and metadata

Asset reissuance

Creating the asset

Let's begin by creating the asset to be used in this tutorial. We start by finding an address that can create assets:

```
devel1@VXLFD271:~$ multichain-cli DemoChain listpermissions issue
{"method":"listpermissions","params":["issue"],"id":"66623446-1541582323","chain_name":"DemoChain"}

[
  {
    "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
    "for" : null,
    "type" : "issue",
    "startblock" : 0,
    "endblock" : 4294967295
  },
  {
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
    "for" : null,
    "type" : "issue",
    "startblock" : 0,
    "endblock" : 4294967295
  }
]
devel1@VXLFD271:~$ multichain-cli DemoChain listaddresses "*" true
{"method":"listaddresses","params":["*","true"],"id":"52912472-1541582356","chain_name":"DemoChain"}


[
  {
    "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
    "ismine" : true,
    "iswatchonly" : false,
    "isscript" : false,
    "pubkey" :
"033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8",
    "iscompressed" : true,
    "account" : "",
    "synchronized" : true
  }
]
```

```

},
{
  "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
  "ismine" : true,
  "iswatchonly" : false,
  "isscript" : false,
  "pubkey" :
"03c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9f",
  "iscompressed" : true,
  "account" : "",
  "synchronized" : true
}
]

```

Nota: An address is suitable if it appears in the output of the first command, and also in the second command together with `"ismine" : true`.

Now let's issue an open asset named GBP using this address, creating 50000 asset units, each of which can be divided into 100 parts, and include some metadata. The issued units will be sent back to the same address:

```

devel1@VBXLF271:~$ multichain-cli DemoChain issuefrom
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT '{"name":"GBP","open":true}' 50000
0.01 0 '{"origin":"uk", "stage":"01", "purpose":"parts prepayment"}'
{"method":"issuefrom", "params":
["18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT", "18vsvGs4YD8NeMTdnPJA3azfoQewotnA
vE7EBT", {"name":"GBP", "open":true}, 50000, 0.01000000, 0,
 {"origin":"uk", "stage":"01", "purpose":"parts prepayment"}], "id":"26002671-
1541582626", "chain_name":"DemoChain"}

```

b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a

MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	219	237	2	2	2	1	2018-10-28	9.7

Latest Transactions

Txid	Type	Confirmation	Time
b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a	Asset	6 confirmations	< 1 minutes

 Transaction b1610f6a82...024a

Hash	b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a
Appeared in	MultiChain DemoChain, Block 217 (2018-11-07 10:24:03)
Number of inputs	1 – jump to inputs
Number of outputs	3 – jump to outputs
Size	317 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

Inputs

Index	Previous output	Native	From address	ScriptSig
0	397ed4a3db...:1	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	71:3044...4301 33:03c1...8e9f

Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG 12:7370...0000 DROP Issue 5000000 raw units of new asset

Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey												
0	Not yet redeemed	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG 12:7370...0000 DROP Issue 5000000 raw units of new asset												
1	Not yet redeemed	0	None	66:7370...6e74 DROP RETURN New Issuance Metadata: <table border="1"> <tr> <td>Asset name</td> <td>GBP</td> </tr> <tr> <td>Open to follow-on issuance</td> <td>True</td> </tr> <tr> <td>Quantity multiple</td> <td>100</td> </tr> <tr> <td>Origin</td> <td>uk</td> </tr> <tr> <td>Purpose</td> <td>parts prepayment</td> </tr> <tr> <td>Stage</td> <td>01</td> </tr> </table>	Asset name	GBP	Open to follow-on issuance	True	Quantity multiple	100	Origin	uk	Purpose	parts prepayment	Stage	01
Asset name	GBP															
Open to follow-on issuance	True															
Quantity multiple	100															
Origin	uk															
Purpose	parts prepayment															
Stage	01															
2	Not yet redeemed	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG												

MultiChain Demo – DemoChain Nodo 1

Node Permissions Issue Asset | Update Send Create Offer | Accept Create Stream Publish View Streams

My Open Issued Assets

Name	GBP
Quantity	50000
Units	0.01
Issuer	NewAddress01 (18vsGvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT, local)
origin	uk
stage	01
purpose	parts prepayment

Update Asset

Asset: GBP

Quantity: 0

To address: NewAddress01 (18vsGvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT, local)

Update file: Examinar... No se ha seleccionado ningún archivo.

Update fields:

key	value

Update Asset

Let's take a look at the new asset:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain help listassets
{"method": "help", "params": ["listassets"], "id": "26763618-1541583185", "chain_name": "DemoChain"}
```

listassets (asset-identifier(s) verbose count start)

Returns list of defined assets

Arguments:

1. **asset-identifier** (string, optional) Asset identifier - one of the following: issue txid, asset reference, asset name.
or
1. asset-identifier(s) (array, optional) A json array of asset identifiers
2. verbose (boolean, optional, default=false) If true, returns list of all issue transactions, including follow-ons
3. count (number, optional, default=INT_MAX - all) The number of assets to display
4. start (number, optional, default=-count - last) Start from specific asset, 0 based, if negative - from the end

Result:

An array containing list of defined assets

Examples:

```
> multichain-cli DemoChain listassets
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id": "curltest", "method": "listassets", "params": [] }' -H 'content-type: text/plain;' http://127.0.0.1:7440
```

```
devel1@VBXLFD271:~$ multichain-cli DemoChain listassets GBP true
{"method":"listassets","params":["GBP",true],"id":"89115003-1541583248","chain_name":"DemoChain"}

[
  {
    "name" : "GBP",
    "issuetxid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
    "assetref" : "217-267-25009",
    "multiple" : 100,
    "units" : 0.01000000,
    "open" : true,
    "details" : {
      "origin" : "uk",
      "stage" : "01",
      "purpose" : "parts prepayment"
    },
    "issueqty" : 50000.00000000,
    "issueraw" : 5000000,
    "subscribed" : false,
    "issues" : [
      {
        "txid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
        "qty" : 50000.00000000,
        "raw" : 5000000,
        "details" : {
          "origin" : "uk",
          "stage" : "01",
          "purpose" : "parts prepayment"
        },
        "issuers" : [
          "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
        ]
      }
    ]
  }
]
```

Note the `issuetxid` which matches the transaction ID displayed before, the `"open" : true` field, meaning that more units of the asset can be created in future, the details field containing the metadata we provided, and the `issueqty` issuance quantity.

We can also check the balance of this asset for this address, which should be `50000`:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain help getaddressbalances
{"method":"help","params":["getaddressbalances"],"id":"39512604-1541585734","chain_name":"DemoChain"}
```

getaddressbalances `"address"` (`minconf` `includeLocked`)

Returns asset balances **for** specified address

Arguments:

1. "address" (string, required) Address to **return** balance **for**.
2. minconf (numeric, optional, default=1) Only include transactions confirmed at least this many **times**.
3. includeLocked (bool, optional, default=false) Also take locked outputs into account

Result:

An array of Objects with totals and details **for** each asset.

Examples:

The total amount **in** the server across all accounts

```
> multichain-cli DemoChain getaddressbalances
"1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd"
> multichain-cli DemoChain getaddressbalances
"1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd" 0 true
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id":"curltest",
"method": "getaddressbalances", "params":
["1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd"] }' -H 'content-type: text/plain;' http://127.0.0.1:7440
```

```
devel1@VBXLFD271:~$ multichain-cli DemoChain getaddressbalances
```

```
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
{"method": "getaddressbalances", "params":
["18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"], "id": "35627812-1541585811", "chain_name": "DemoChain"}
```

```
[
  {
    "name" : "GBP",
    "assetref" : "217-267-25009",
    "qty" : 50000.00000000
  }
]
```

Issuing more asset units

Now we'll issue some more units of the same asset. First, let's create a new address which will receive the new units:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain getnewaddress
{"method": "getnewaddress", "params": [], "id": "47704622-1541585920", "chain_name": "DemoChain"}
```

```
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
```

We need to grant this address the permission to receive (and later, send) transactions:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain grant
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3 receive,send
{"method":"grant","params": [
["15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3","receive,send"],"id":"28425625-1541586002","chain_name":"DemoChain"}
```

d90ca98b99265307cdf8d73a8e0dc73e338890011968bf9dc5348e532c0c3565

Now we're ready to issue **25000** more units of GBP to this new address, with some additional metadata:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain issuemorefrom
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3 GBP 25000 0 '{"origin":"europe",
"stage":"02", "approval":"department"}'
{"method":"issuemorefrom","params": [
["18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT","15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3", "GBP", 25000, 0,
 {"origin":"europe", "stage":"02", "approval":"department"}],"id":"28919335-1541586104","chain_name":"DemoChain"}
```

3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89

MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	219	237	2	2	2	1	2018-10-28	9.7

Latest Transactions

Txid	Type	Confirmation	Time
3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89	Asset	5 confirmations	< 1 minutes

Transaction 3b117ce4a0...3f89

Hash	3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89
Appeared in	MultiChain DemoChain, Block 239 (2018-11-07 11:22:07)
Number of inputs	1 – jump to inputs
Number of outputs	3 – jump to outputs
Size	337 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

Inputs

Index	Previous output	Native	From address	ScriptSig
0	b1610f6a82...:2	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	71:3044...bb01 33:03c1...8e9f

Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey						
0	Not yet redeemed	0	15fzSoXtzqCVLJ92fVT6yx5XuKQqBuQvEP1s3	DUP HASH160 20:2291...b616 EQUALVERIFY CHECKSIG 28:7370...0000 DROP						
				Issue 25000.00 more units of GBP						
1	Not yet redeemed	0	None	20:7370...61b1 DROP 48:7370...6e74 DROP RETURN						
				Follow-on issuance metadata for GBP						
				<table border="1"> <tr> <td>Approval</td><td>department</td></tr> <tr> <td>Origin</td><td>europe</td></tr> <tr> <td>Stage</td><td>02</td></tr> </table>	Approval	department	Origin	europe	Stage	02
Approval	department									
Origin	europe									
Stage	02									
2	Not yet redeemed	0	18vsyGs4YD8NeMTdnP1A3azfoQewntnAvE7ERT	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG						



 MultiChain DemoChain

Asset Summary "GBP"

Issue Block Height	217
Issue Block Time	1541582643 (2018-11-07 10:24:03)
Issue TXID	b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a
Asset Reference	217-267-25009
Name	GBP
Addresses holding units	2 – jump to holders
Asset Issues	2 – jump to issues
Raw units issued	7500000
Display quantity	75000.00
Native amount sent	0
Issuer Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Issue Recipient Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT

Multichain JSON

```

},
"multiple": 100,
"name": "GBP",
"open": true,
"type": "issuemore"
},
"locktime": 0,
"time": 1541582643,
"txid": "b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
"version": 1,
"vin": [
{
"scriptSig": {
"asm": "304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa149937080b85f37ae02205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d430103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9f",
"hex": "47304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa149937080b85f37ae02205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d43012103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9f"
},
"sequence": 4294967295,
"txid": "397ed4a3dbbb78490680656004a1d9bf36a92d0ab317e5112aab5ef618fe5fd1",
"vout": 1
},
],
"vout": [
{
"assets": [
{
"assetref": "217-267-25009",
"issuetxid": "b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
"name": "GBP",
"qty": 50000.0,
"raw": 5000000,
"type": "issuemore"
}
],
"items": [],
"n": 0,
"permissions": [],
"scriptPubKey": {
"addresses": [
"18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
"asm": "OP_DUP OP_HASH160 3aaa622500ef363a9697343cd268c21da3de8b39OP_EQUALVERIFY OP_CHECKSIG 73706b67404b4c000000000000 OP_DROP",
"hex": "76a9143aaa622500ef363a9697343cd268c21da3de8b3988ac0c73706b67404b4c00000000000075",
"reqSigs": 1,
}
}
]
}

```

```

    "type": "pubkeyhash"
  },
  "value": 0.0
},
{
  "assets": [],
  "items": [],
  "n": 1,
  "permissions": [],
  "scriptPubKey": {
    "asm":
"73706b6e01000103474250004104640000000000201016f726967696e0002756b7374616765
00023031707572706f736500107061727473207072657061796d656e74 OP_DROP
OP_RETURN",
    "hex":
"4273706b6e01000103474250004104640000000000201016f726967696e0002756b73746167
6500023031707572706f736500107061727473207072657061796d656e74756a",
    "type": "nulldata"
  },
  "value": 0.0
},
{
  "assets": [],
  "items": [],
  "n": 2,
  "permissions": [],
  "scriptPubKey": {
    "addresses": [
      "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
    ],
    "asm": "OP_DUP OP_HASH160 3aaa622500ef363a9697343cd268c21da3de8b39
OP_EQUALVERIFY OP_CHECKSIG",
    "hex": "76a9143aaa622500ef363a9697343cd268c21da3de8b3988ac",
    "reqSigs": 1,
    "type": "pubkeyhash"
  },
  "value": 0.0
}
]
}

```

Asset Issues

Txid	Issue Amount	Details	
b1610f6a...	50000.00	origin	uk
		purpose	parts prepayment
		stage	01
3b117ce4...	25000.00	approval	department
		origin	europe
		stage	02

Asset Holders

Address	Balance
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	50000.00 (transactions)
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3	25000.00 (transactions)

Transactions

Transaction	Block
b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a	217
3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89	239

MultiChain Demo – DemoChain Nodo 1

Node	Permissions	Issue Asset	Update	Send	Create Offer Accept	Create Stream	Publish	View Streams
----------------------	-----------------------------	-----------------------------	------------------------	----------------------	---------------------------------------	-------------------------------	-------------------------	------------------------------

My Open Issued Assets

Name	GBP
Quantity	75000
Units	0.01
Issuer	NewAddress01 (18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT, local)
origin	europe (previous values: uk)
stage	02 (previous values: 01)
purpose	parts prepayment
approval	department

Update Asset

Asset:	GBP										
Quantity:	0										
To address:	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3 (local)										
Update file:	Examinar... No se ha seleccionado ningún archivo.										
Update fields:	<table border="1"> <tr> <td>key</td> <td>value</td> </tr> </table>	key	value								
key	value										
key	value										
key	value										
key	value										
key	value										
Update Asset											

NOTA: VER en la casilla **To address** la dirección del **receptor** o **asset holder**

Now let's check our asset's status:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain listassets GBP {"method":"listassets","params": ["GBP"],"id":"49573268-1541586964","chain_name":"DemoChain"}
```

```
[ { "name" : "GBP", "issuetxid" : "b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a", "assetref" : "217-267-
```

```
25009", "multiple" : 100, "units" : 0.01000000, "open" : true, "details" : { "origin" : "uk", "stage" : "01", "purpose" : "parts prepayment" }, "issueqty" : 75000.00000000, "issueraw" : 7500000, "subscribed" : false }
```

Note the increased `issueqty` field, but the metadata shown is still for the original issuance only. For more details:

```
```sh
devel1@VBXLFD271:~$ multichain-cli DemoChain listassets GBP true
{"method":"listassets","params":["GBP",true],"id":"77668068-1541586972","chain_name":"DemoChain"}
```

[

- {
- "name" : "GBP",
- "issuetxid" :
- "b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
- "assetref" : "217-267-25009",
- "multiple" : 100,
- "units" : 0.01000000,
- "open" : true,
- "details" : {
- "origin" : "uk",
- "stage" : "01",
- "purpose" : "parts prepayment"
- },
- "issueqty" : 75000.00000000,
- "issueraw" : 7500000,
- "subscribed" : false,
- "issues" : [
- {
- "txid" :
- "b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
- "qty" : 50000.00000000,
- "raw" : 5000000,
- "details" : {
- "origin" : "uk",
- "stage" : "01",
- "purpose" : "parts prepayment"
- },
- "issuers" : [
- "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
- ]
- },
- {
- "txid" :
- "3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89",
- "qty" : 25000.00000000,
- "raw" : 2500000,
- "details" : {
- "origin" : "europe",
- "stage" : "02",
- "approval" : "department"
- },
- }
- }
- }
- }
- }
- }
- }

```

 "issuers" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
]
 }
]
}

```

This includes an `issues` array that provides details of each individual issuance for this asset. For each element in the array, the txid transaction ID is shown, along with the quantity in `qty` and the metadata details of that issuance.

We can also view the new asset's balance for both addresses:

```

devel1@VBXLFD271:~$ multichain-cli DemoChain getmultibalances "*" GBP
{"method":"getmultibalances","params":["*","GBP"],"id":"89868477-1541587217","chain_name":"DemoChain"}

{
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 25000.00000000
 }
],
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 50000.00000000
 }
],
 "total" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 75000.00000000
 }
]
}

```

This should show **50000** units for `18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT`, **25000** units for `15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3`, and a `total` of **75000** units.

## Granting issue permissions

In this stage we'll give other addresses the permission to issue more units of the asset. Let's begin by seeing the current asset permissions:

```
devel1@VXLFD271:~$ multichain-cli DemoChain listpermissions GBP.*
{"method":"listpermissions","params":["GBP.*"],"id":"22195651-1541587410","chain_name":"DemoChain"}

[
 {
 "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
 "for" : {
 "type" : "asset",
 "name" : "GBP",
 "assetref" : "217-267-25009"
 },
 "type" : "admin",
 "startblock" : 0,
 "endblock" : 4294967295
 },
 {
 "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
 "for" : {
 "type" : "asset",
 "name" : "GBP",
 "assetref" : "217-267-25009"
 },
 "type" : "issue",
 "startblock" : 0,
 "endblock" : 4294967295
 }
]
```

The issuing address **18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT** should have two permissions for the asset. The issue permission allows it to issue more units of the asset, and the **admin** permission allows it to control the permissions of other addresses for this asset.

Now let's try issuing more units of the asset **from the second address** (**15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3**) (to itself):

```
devel1@VXLFD271:~$ multichain-cli DemoChain issuemorefrom
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3 GBP 15000 0
{"method":"issuemorefrom","params":
["15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3","15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3","GBP",15000,0],"id":"44045137-1541587569","chain_name":"DemoChain"}

error code: -704
error message:
Issuing more units for this asset is not allowed from this address
```

An error should be displayed, indicating that this address does not have permission to issue more units. So let's use the first address to grant them:

```
devel1@VXLFD271:~$ multichain-cli DemoChain grantfrom
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
```

```
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3 GBP.issue
{"method":"grantfrom", "params":
["18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT", "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQ
vEP1s3", "GBP.issue"], "id":"22934515-1541587651", "chain_name": "DemoChain"}
```

e6d8e7218e938bad049c1f276d27724bdc03e4ad25727887a06de721f89c2f29

Let's check that the permission change was applied:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain listpermissions GBP.issue
{"method":"listpermissions", "params":["GBP.issue"], "id":"86423965-
1541587714", "chain_name": "DemoChain"}
```

```
[
 {
 "address" : "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3",
 "for" : {
 "type" : "asset",
 "name" : "GBP",
 "assetref" : "217-267-25009"
 },
 "type" : "issue",
 "startblock" : 0,
 "endblock" : 4294967295
 },
 {
 "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
 "for" : {
 "type" : "asset",
 "name" : "GBP",
 "assetref" : "217-267-25009"
 },
 "type" : "issue",
 "startblock" : 0,
 "endblock" : 4294967295
 }
]
```

Both addresses should now be displayed

# MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	219	237	2	2	2	1	2018-10-28	9.7

## Latest Transactions

Txid	Type	Confirmation	Time
e6d8e7218e938bad049c1f276d27724bdc03e4ad25727887a06de721f89c2f29	Permissions	11 confirmations	< 2 minutes

## Transaction e6d8e7218e...2f29

Hash	e6d8e7218e938bad049c1f276d27724bdc03e4ad25727887a06de721f89c2f29
Appeared in	MultiChain DemoChain, Block 250 (2018-11-07 11:47:53)
Number of inputs	1 – jump to inputs
Number of outputs	2 – jump to outputs
Size	270 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

### Inputs

Index	Previous output	Native	From address	ScriptSig
0	3b117ce4a0...:2	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	72:3045...5d01 33:03c1...8e9f

### Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3	DUP HASH160 20:2291...b616 EQUALVERIFY CHECKSIG 20:7370...61b1 DROP 20:7370...e25b DROP
1	Not yet redeemed	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG

[Grant permission to Issue on asset GBP](#)

## MultiChain DemoChain

### Asset Summary "GBP"

Issue Block Height	217
Issue Block Time	1541582643 (2018-11-07 10:24:03)
Issue TXID	b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a
Asset Reference	217-267-25009
Name	GBP
Addresses holding units	2 – jump to holders
Asset Issues	2 – jump to issues
Raw units issued	7500000
Display quantity	75000.00
Native amount sent	0
Issuer Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Issue Recipient Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT

[MultiChain JSON](#)

```
{
 "blockhash": "
```

```
"00ac146c77db27c731856f3bd117ca33255928f1dc45c2293c5d1e53eacca866",
 "blocktime": 1541582643,
 "confirmations": 44,
 "data": [],
 "hex":
"0100000001d15ffe18f65eab2a11e517b30a2da936bfd9a104606580064978bbdba3d47e39
010000006a47304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa14993708
0b85f37ae02205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d
43012103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9ffff
fffff030000000000000000002776a9143aaa622500ef363a9697343cd268c21da3de8b3988ac
0c73706b67404b4c000000000075000000000000000454273706b6e0100010347425000410
464000000000201016f726967696e0002756b737461676500023031707572706f7365001070
61727473207072657061796d656e74756a000000000000000001976a9143aaa622500ef363a9
697343cd268c21da3de8b3988ac00000000",
 "issue": {
 "details": {
 "origin": "uk",
 "purpose": "parts prepayment",
 "stage": "01"
 },
 "multiple": 100,
 "name": "GBP",
 "open": true,
 "type": "issuefirst"
 },
 "locktime": 0,
 "time": 1541582643,
 "txid":
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "version": 1,
 "vin": [
 {
 "scriptSig": {
 "asm":
"304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa149937080b85f37ae02
205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d4301
03c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9f",
 "hex":
"47304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa149937080b85f37ae
02205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d43012103c
19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9f"
 },
 "sequence": 4294967295,
 "txid":
"397ed4a3dbbb78490680656004a1d9bf36a92d0ab317e5112aab5ef618fe5fd1",
 "vout": 1
 }
],
 "vout": [
 {
 "assets": [
 {
 "assetref": "217-267-25009",
 "issuetxid":
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "txid": "b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a"
 }
]
 }
]
}
```

```

 "name": "GBP",
 "qty": 50000.0,
 "raw": 5000000,
 "type": "issuemore"
 },
],
"items": [],
"n": 0,
"permissions": [],
"scriptPubKey": {
 "addresses": [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "asm": "OP_DUP OP_HASH160 3aaa622500ef363a9697343cd268c21da3de8b39
OP_EQUALVERIFY OP_CHECKSIG 73706b67404b4c000000000000 OP_DROP",
 "hex": "76a9143aaa622500ef363a9697343cd268c21da3de8b3988ac0c73706b67404b4c00000000
0075",
 "reqSigs": 1,
 "type": "pubkeyhash"
},
"value": 0.0
},
{
 "assets": [],
 "items": [],
 "n": 1,
 "permissions": [],
 "scriptPubKey": {
 "asm": "73706b6e0100010347425000410464000000000201016f726967696e0002756b7374616765
00023031707572706f736500107061727473207072657061796d656e74 OP_DROP
OP_RETURN",
 "hex": "4273706b6e0100010347425000410464000000000201016f726967696e0002756b73746167
6500023031707572706f736500107061727473207072657061796d656e74756a",
 "type": "nulldata"
},
"value": 0.0
},
{
 "assets": [],
 "items": [],
 "n": 2,
 "permissions": [],
 "scriptPubKey": {
 "addresses": [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "asm": "OP_DUP OP_HASH160 3aaa622500ef363a9697343cd268c21da3de8b39
OP_EQUALVERIFY OP_CHECKSIG",
 "hex": "76a9143aaa622500ef363a9697343cd268c21da3de8b3988ac",
 "reqSigs": 1,
 "type": "pubkeyhash"
}
}

```

```

 "value": 0.0
}
]
}

```

## Asset Issues

Txid	Issue Amount	Details	
b1610f6a...	50000.00	origin	uk
		purpose	parts prepayment
		stage	01
3b117ce4...	25000.00	approval	department
		origin	europe
		stage	02

## Asset Holders

Address	Balance
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	50000.00 ( <a href="#">transactions</a> )
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3	25000.00 ( <a href="#">transactions</a> )

## Transactions

Transaction	Block
b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a	217
3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89	239

As both addresses have issue permissions, so let's try the reissuance from the second address again:

```

devel1@VBXLFD271:~$ multichain-cli DemoChain issuemorefrom
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3 GBP 15000 0
{"method":"issuemorefrom", "params":
["15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3", "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3", "GBP", 15000, 0], "id":"48023261-1541588255", "chain_name":"DemoChain"}

```

464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29

This time a transaction ID should be shown instead of an error. Let's look at all issuances of the asset so far:

## MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	266	288	2	3	2	1	2018-10-28	9.7

## Latest Transactions

Txid	Type	Confirmation	Time
464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29	Asset	11 confirmations	< 1 minutes

2018-11-11

 Transaction 464196be7d...ec29

Hash	464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29
Appeared in	MultiChain DemoChain, Block 261 (2018-11-07 11:57:54)
Number of inputs	1 – jump to inputs
Number of outputs	2 – jump to outputs
Size	255 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

## Inputs

Index	Previous output	Native	From address	ScriptSig
0	e6d8e7218e...0	0	<a href="#">15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3</a>	71:3044...3a01 33:030b...459f

## Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	<a href="#">15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3</a>	DUP HASH160 20:2291...b616 EQUALVERIFY CHECKSIG 28:7370...0000 DROP
				Issue 15000.00 more units of GBP
1	Not yet redeemed	0	<a href="#">15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3</a>	DUP HASH160 20:2291...b616 EQUALVERIFY CHECKSIG

```
devel1@VBXLFD271:~$ multichain-cli DemoChain listassets GBP true
{"method":"listassets","params":["GBP",true],"id":"49913416-1541588530","chain_name":"DemoChain"}
```

```
[
 {
 "name" : "GBP",
 "issuetxid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "assetref" : "217-267-25009",
 "multiple" : 100,
 "units" : 0.01000000,
 "open" : true,
 "details" : {
 "origin" : "uk",
 "stage" : "01",
 "purpose" : "parts prepayment"
 },
 "issueqty" : 90000.00000000,
 "issueraw" : 9000000,
 "subscribed" : false,
 "issues" : [
 {
 "txid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "qty" : 50000.00000000,
 "raw" : 5000000,
 "details" : {
 "origin" : "uk",
 "stage" : "01",
 }
 }
]
 }
]
```

```

 "purpose" : "parts prepayment"
 },
 "issuers" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
]
},
{
 "txid" :
"3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89",
 "qty" : 25000.00000000,
 "raw" : 2500000,
 "details" : {
 "origin" : "europe",
 "stage" : "02",
 "approval" : "department"
 },
 "issuers" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
]
},
{
 "txid" :
"464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29",
 "qty" : 15000.00000000,
 "raw" : 1500000,
 "details" : {
 },
 "issuers" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
]
}
]
}
]
```

```
devel1@VBXLFD271:~$ multichain-cli DemoChain getmultibalances "*" GBP
{"method":"getmultibalances","params":["*","GBP"],"id":"77447057-1541588643","chain_name":"DemoChain"}
```

```
{
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 40000.00000000
 }
],
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 50000.00000000
 }
],
 "total" : [

```

```
{
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
}
]
```

Note that **three issuances** are now shown, with **the third** showing an **empty details field** (since no metadata was passed to the `issuemorefrom` command) and a different address in the issuers field from the first two.

```
"details" : {
},
"issuers" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
]
```

## MultiChain DemoChain

### Asset Summary "GBP"

Issue Block Height	<a href="#">217</a>
Issue Block Time	1541582643 (2018-11-07 10:24:03)
Issue TXID	b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a
Asset Reference	<a href="#">217-267-25009</a>
Name	GBP
Addresses holding units	<a href="#">2 – jump to holders</a>
Asset Issues	<a href="#">3 – jump to issues</a>
Raw units issued	900000
Display quantity	90000.00
Native amount sent	0
Issuer Address	<a href="#">18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT</a>
Issue Recipient Address	<a href="#">18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT</a>

[MultiChain JSON](#)

**Asset Issues**

Txid	Issue Amount	Details	
b1610f6a...	50000.00	origin	uk
		purpose	parts prepayment
		stage	01
3b117ce4...	25000.00	approval	department
		origin	europe
		stage	02
464196be...	15000.00		

**Asset Holders**

Address	Balance
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	50000.00 (transactions)
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3	40000.00 (transactions)

**Transactions**

Transaction	Block
b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a	217
3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89	239
464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29	261

```
{
 "blockhash": "00ac146c77db27c731856f3bd117ca33255928f1dc45c2293c5d1e53eacca866",
 "blocktime": 1541582643,
 "confirmations": 55,
 "data": [],
 "hex": "0100000001d15ffe18f65eab2a11e517b30a2da936bfd9a104606580064978bbdba3d47e39
010000006a47304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa14993708
0b85f37ae02205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d
43012103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9ffff
fffff030000000000000000002776a9143aaa622500ef363a9697343cd268c21da3de8b3988ac
0c73706b67404b4c00000000007500000000000000454273706b6e0100010347425000410
464000000000201016f726967696e0002756b737461676500023031707572706f7365001070
61727473207072657061796d656e74756a00000000000000001976a9143aaa622500ef363a9
697343cd268c21da3de8b3988ac00000000",
 "issue": {
 "details": {
 "origin": "uk",
 "purpose": "parts prepayment",
 "stage": "01"
 },
 "multiple": 100,
 "name": "GBP",
 "open": true,
 "type": "issuemore"
 },
 "locktime": 0,
 "time": 1541582643,
 "txid": "b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "value": 50000
}
```

```

"version": 1,
"vin": [
{
 "scriptSig": {
 "asm":
"304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa149937080b85f37ae02
205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d4301
03c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9f",
 "hex":
"47304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa149937080b85f37ae
02205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d43012103c
19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9f"
 },
 "sequence": 4294967295,
 "txid":
"397ed4a3dbbb78490680656004a1d9bf36a92d0ab317e5112aab5ef618fe5fd1",
 "vout": 1
},
],
"vout": [
{
 "assets": [
{
 "assetref": "217-267-25009",
 "issuetxid":
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "name": "GBP",
 "qty": 50000.0,
 "raw": 5000000,
 "type": "issuefirst"
 }
],
 "items": [],
 "n": 0,
 "permissions": [],
 "scriptPubKey": {
 "addresses": [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "asm": "OP_DUP OP_HASH160 3aaa622500ef363a9697343cd268c21da3de8b39
OP_EQUALVERIFY OP_CHECKSIG 73706b67404b4c000000000000 OP_DROP",
 "hex":
"76a9143aaa622500ef363a9697343cd268c21da3de8b3988ac0c73706b67404b4c000000000
0075",
 "reqSigs": 1,
 "type": "pubkeyhash"
 },
 "value": 0.0
},
{
 "assets": [],
 "items": [],
 "n": 1,
 "permissions": [],
 "scriptPubKey": {
}
}
]
}

```

```

 "asm": "73706b6e0100010347425000410464000000000201016f726967696e0002756b7374616765
00023031707572706f736500107061727473207072657061796d656e74 OP_DROP
OP_RETURN",
 "hex": "4273706b6e0100010347425000410464000000000201016f726967696e0002756b73746167
6500023031707572706f736500107061727473207072657061796d656e74756a",
 "type": "nulldata"
},
"value": 0.0
},
{
"assets": [],
"items": [],
"n": 2,
"permissions": [],
"scriptPubKey": {
"addresses": [
"18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
"asm": "OP_DUP OP_HASH160 3aaa622500ef363a9697343cd268c21da3de8b39
OP_EQUALVERIFY OP_CHECKSIG",
"hex": "76a9143aaa622500ef363a9697343cd268c21da3de8b3988ac",
"reqSigs": 1,
"type": "pubkeyhash"
},
"value": 0.0
}
]
}

```

## Metadata-only issuance

Finally let's see an example of a reissuance whose sole purpose is to add some metadata to the asset, and not create any new units. This is achieved simply by passing zero for the quantity parameter:

```

devel1@VBXLFD271:~$ multichain-cli DemoChain issuemorefrom
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT GBP 0 0 '{"approval":"head office"}'
{"method":"issuemorefrom", "params":
[{"18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT", "18vsvGs4YD8NeMTdnPJA3azfoQewotnA
vE7EBT", "GBP", 0, 0, {"approval":"head office"}], "id":"83799643-
1541597789", "chain_name":"DemoChain"}

```

65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310

 MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	275	298	2	3	2	1	2018-10-28	9.8

### Latest Transactions

Txid	Type	Confirmation	Time
65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310	Asset	6 confirmations	< 1 minute

## Transaction 65f8b3971f...c310

Hash	65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310
Appeared in	MultiChain DemoChain, Block 272 (2018-11-07 14:36:50)
Number of inputs	1 – jump to inputs
Number of outputs	3 – jump to outputs
Size	315 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

### Inputs

Index	Previous output	Native	From address	ScriptSig
0	e6d8e7218e...:1	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	71:3044...2e01 33:03c1...8e9f

### Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG 28:7370...0000 DROP
				Issue 0.00 more units of GBP
1	Not yet redeemed	0	None	20:7370...61b1 DROP 26:7370...6365 DROP RETURN
				Follow-on issuance metadata for GBP
				Approval head office
2	Not yet redeemed	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG

 MultiChain DemoChain

## Asset Summary "GBP"

Issue Block Height	217
Issue Block Time	1541582643 (2018-11-07 10:24:03)
Issue TXID	b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a
Asset Reference	217-267-25009
Name	GBP
Addresses holding units	2 – jump to holders
Asset Issues	4 – jump to issues
Raw units issued	9000000
Display quantity	90000.00
Native amount sent	0
Issuer Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Issue Recipient Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT

[MultiChain JSON](#)

## Asset Issues

Txid	Issue Amount	Details						
b1610f6a...	50000.00	<table border="1"> <tr><td>origin</td><td>uk</td></tr> <tr><td>purpose</td><td>parts prepayment</td></tr> <tr><td>stage</td><td>01</td></tr> </table>	origin	uk	purpose	parts prepayment	stage	01
origin	uk							
purpose	parts prepayment							
stage	01							
3b117ce4...	25000.00	<table border="1"> <tr><td>approval</td><td>department</td></tr> <tr><td>origin</td><td>europe</td></tr> <tr><td>stage</td><td>02</td></tr> </table>	approval	department	origin	europe	stage	02
approval	department							
origin	europe							
stage	02							
464196be...	15000.00							
65f8b397...	0.00	<table border="1"> <tr><td>approval</td><td>head office</td></tr> </table>	approval	head office				
approval	head office							

## Asset Holders

Address	Balance
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	50000.00 ( <a href="#">transactions</a> )
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3	40000.00 ( <a href="#">transactions</a> )

## Transactions

Transaction	Block
b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a	217
3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89	239
464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29	261
65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310	272

## MultiChain Demo – DemoChain Nodo 1

[Node](#)   [Permissions](#)   [Issue Asset | Update](#)   [Send](#)   [Create Offer | Accept](#)   [Create Stream](#)   [Publish](#)   [View Streams](#)

My Open Issued Assets

Name	GBP
Quantity	90000
Units	0.01
Issuer	NewAddress01 (18vsG54YD8NeMTdnPJA3azfoQewotnAvE7EBT, local)
origin	europe (previous values: uk)
stage	02 (previous values: 01)
purpose	parts prepayment
approval	head office (previous values: department)

Update Asset

**Asset:**

**Quantity:**

**To address:**

**Update file:**  No se ha seleccionado ningún archivo.  
Max 2047 KB

**Update fields:**

key	value

The metadata-only issuance event can be viewed here:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain listassets GBP true
{"method":"listassets","params":["GBP",true],"id":"19162107-1541598390","chain_name":"DemoChain"}

[
 {
 "name" : "GBP",
 "issuetxid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "assetref" : "217-267-25009",
 "multiple" : 100,
 "units" : 0.01000000,
 "open" : true,
 "details" : {
 "origin" : "uk",
 "stage" : "01",
 "purpose" : "parts prepayment"
 },
 "issueqty" : 90000.00000000,
 "issueraw" : 9000000,
 "subscribed" : false,
 "issues" : [
 {
 "txid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "qty" : 50000.00000000,
 "raw" : 5000000,
 "details" : {
 "origin" : "uk",
 }
 }
]
 }
]
```

```

 "stage" : "01",
 "purpose" : "parts prepayment"
 },
 "issuers" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
]
},
{
 "txid" :
"3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89",
 "qty" : 25000.00000000,
 "raw" : 2500000,
 "details" : {
 "origin" : "europe",
 "stage" : "02",
 "approval" : "department"
 },
 "issuers" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
]
},
{
 "txid" :
"464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29",
 "qty" : 15000.00000000,
 "raw" : 1500000,
 "details" : {
 },
 "issuers" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
]
},
{
 "txid" :
"65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310",
 "qty" : 0.00000000,
 "raw" : 0,
 "details" : {
 "approval" : "head office"
 },
 "issuers" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
]
}
]
}
]
```

## Where to go from here

Congratulations! You have successfully created a new asset, with multiple issuance events and associated metadata. In a similar way to assets, streams can also be created with custom metadata, but in this case

there is no notion of a follow-on event.

- 1) Subscribing to an asset using the `subscribe` command, then using `listassettransactions` and `getassettransaction` to query the full list of that asset's transactions, whether or not they involve an address in this node's wallet.

En nodo 1:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain help subscribe
{"method": "help", "params": ["subscribe"], "id": "62256747-1541598745", "chain_name": "DemoChain"}
```

`subscribe entity-identifier(s) ( rescan )`

Subscribes to the stream.

Arguments:

- 1. `"stream-identifier"` (string, required) Stream identifier - one of the following: stream txid, stream reference, stream name.  
or
- 1. `"asset-identifier"` (string, required) Asset identifier - one of the following: asset txid, asset reference, asset name.  
or
- 1. `entity-identifier(s)` (array, optional) A json array of stream or asset identifiers
- 2. `rescan` (boolean, optional, default=`true`) Rescan the wallet for transactions

Note: This call can take minutes to complete if rescan is `true`.

Result:

Examples:

Subscribe to the stream with rescan

```
> multichain-cli DemoChain subscribe "test-stream"
```

Subscribe to the stream without rescan

```
> multichain-cli DemoChain subscribe "test-stream" false
```

As a JSON-RPC call

```
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id": "curltest", "method": "subscribe", "params": ["test-stream", false] }' -H 'content-type: text/plain;' http://127.0.0.1:7440
```

```
devel1@VBXLFD271:~$ multichain-cli DemoChain help listassettransactions
{"method": "help", "params": ["listassettransactions"], "id": "76388538-1541598990", "chain_name": "DemoChain"}
```

`listassettransactions "asset-identifier" ( verbose count start local-ordering )`

Lists transactions involving asset.

## Arguments:

```

1. "asset-identifier" (string, required) Asset identifier - one of the following: asset txid, asset reference, asset name.
2. verbose (boolean, optional, default=false) If true, returns information about transaction
3. count (number, optional, default=10) The number of transactions to display
4. start (number, optional, default=-count - last) Start from specific transaction, 0 based, if negative - from the end
5. local-ordering (boolean, optional, default=false) If true, transactions appear in the order they were processed by the wallet, if false - in the order they appear in blockchain

```

## Result:

"stream-items" (array) List of transactions.

## Examples:

```

> multichain-cli DemoChain listassettransactions "test-asset"
> multichain-cli DemoChain listassettransactions "test-asset" true 10 100
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id":"curltest", "method": "listassettransactions", "params": ["test-asset", false, 20] }' -H 'content-type: text/plain;' http://127.0.0.1:7440

```

Probamos en nodo 1 `listassettransactions` sin antes subscribirme a el `asset`

```

devel1@VBXLF271:~$ multichain-cli DemoChain listassettransactions GBP true
{"method": "listassettransactions", "params": ["GBP", true], "id": "69633991-1541598863", "chain_name": "DemoChain"}

error code: -703
error message:
Not subscribed to this asset

```

Nos subscribimos al asset `GBP` (with rescan) en nodo 1

```

devel1@VBXLF271:~$ multichain-cli DemoChain subscribe "GBP" true
{"method": "subscribe", "params": ["GBP", true], "id": "15070639-1541599202", "chain_name": "DemoChain"}

```

Probamos nuevament en nodo 1 `listassettransactions`:

```

devel1@VBXLF271:~$ multichain-cli DemoChain subscribe "GBP" true
{"method": "subscribe", "params": ["GBP", true], "id": "15070639-1541599202", "chain_name": "DemoChain"}
```

  

```

devel1@VBXLF271:~$ multichain-cli DemoChain listassettransactions GBP true
{"method": "listassettransactions", "params": ["GBP", true], "id": "75453070-1541599202", "chain_name": "DemoChain"}
```

```
1541599271", "chain_name": "DemoChain"}
```

```
[
 {
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : 50000.00000000
],
 "items" : [
],
 "data" : [
],
 "confirmations" : 66,
 "blockhash" :
 "00ac146c77db27c731856f3bd117ca33255928f1dc45c2293c5d1e53eacca866",
 "blockindex" : 1,
 "blocktime" : 1541582643,
 "txid" :
 "b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "valid" : true,
 "time" : 1541582626,
 "timereceived" : 1541582626,
 "vin" : [
 {
 "txid" :
 "397ed4a3dbbb78490680656004a1d9bf36a92d0ab317e5112aab5ef618fe5fd1",
 "vout" : 1,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
]
 }
],
 "vout" : [
 {
 "n" : 0,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 50000.00000000,
 "type" : "issuefirst"
 }
],
 }
],
 }
]
```

```
"permissions" : [
],
"items" : [
]
},
{
 "n" : 1,
 "addresses" : [
],
"type" : "nulldata",
"ismine" : false,
"iswatchonly" : false,
"amount" : 0.00000000,
"assets" : [
],
"permissions" : [
],
"items" : [
]
},
{
 "n" : 2,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
"type" : "pubkeyhash",
"ismine" : true,
"iswatchonly" : false,
"amount" : 0.00000000,
"assets" : [
],
"permissions" : [
],
"items" : [
]
}
],
"hex" :
"0100000001d15ffe18f65eab2a11e517b30a2da936bfd9a104606580064978bbdba3d47e39
010000006a47304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa14993708
0b85f37ae02205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d
43012103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9ffff
fffff03000000000000000000002776a9143aaa622500ef363a9697343cd268c21da3de8b3988ac
0c73706b67404b4c0000000000750000000000000000454273706b6e0100010347425000410
464000000000201016f726967696e0002756b737461676500023031707572706f7365001070
61727473207072657061796d656e74756a00000000000000001976a9143aaa622500ef363a9
697343cd268c21da3de8b3988ac00000000"
},
{
 "addresses" : {
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : 25000.00000000
},
"items" : [
],
"data" : [
]
```

```

],
 "confirmations" : 44,
 "blockhash" :
"000872cee4372756a538d353c3f23b707f220e901951e313e15a38ca01da3589",
 "blockindex" : 1,
 "blocktime" : 1541586127,
 "txid" :
"3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89",
 "valid" : true,
 "time" : 1541586104,
 "timereceived" : 1541586104,
 "vin" : [
 {
 "txid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "vout" : 2,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
]
 }
],
 "vout" : [
 {
 "n" : 0,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 25000.00000000,
 "type" : "issuemore"
 }
],
 "permissions" : [
],
 "items" : [
]
 },
 {
 "n" : 1,
 "addresses" : [
],
 "type" : "nulldata",

```

```

 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
 },
 {
 "n" : 2,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
 }
],
"hex" :
"01000000014a02362fdd13ca61927cd46a946595bde183ef5762110b442ab2da826a0f61b1
020000006a47304402207ba2ab505f6ab4464dcac785baf5f4846e5be42cb8b3f91425af606
d26ac22cc02206fde045eeaf068453dbc3552729f0818ecf50df115616e192b1b68e0490abd
bb012103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9ffff
fffff030000000000000000003776a9142291d2bc7aeee4c4c591bfc98d3364f5dd8cb61688ac
1c73706b6fe183ef5762110b442ab2da826a0f61b1a0252600000000000750000000000000000
0491473706b65e183ef5762110b442ab2da826a0f61b1753073706b75016f726967696e0006
6575726f7065737461676500023032617070726f76616c000a6465706172746d656e74756a0
00000000000000001976a9143aaa622500ef363a9697343cd268c21da3de8b3988ac00000000
"
},
{
 "addresses" : {
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : 15000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 22,
 "blockhash" :
"00341fe461262a3e671d8b13f8177eca8898184ae2df4b5d6cf1c2470fc56cd7",
 "blockindex" : 1,
 "blocktime" : 1541588274,
 "txid" :
"464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29",
 "valid" : true,

```

```

"time" : 1541588255,
"timereceived" : 1541588255,
"vin" : [
 {
 "txid" :
"e6d8e7218e938bad049c1f276d27724bdc03e4ad25727887a06de721f89c2f29",
 "vout" : 0,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
]
 }
],
"vout" : [
{
 "n" : 0,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 15000.00000000,
 "type" : "issuemore"
 }
],
 "permissions" : [
],
 "items" : [
]
},
{
 "n" : 1,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
}
]

```

```

],
],
 "hex" :
"0100000001292f9cf821e76da087787225ade403dc4b72276d271f9c04ad8b938e21e7d8e6
000000006a4730440220406150e31e6b26855c9122a09bf3d1aa993795fa218f37975cadf0b
fdd1d763d022000c3c9775bfd880cafde2e44934ef5d11297ab7fc26aab76c46985046087e1
3a0121030b57a7bcd3fa4714717fa4eeebd067051a4728b1ac5dbf6a6ac4cdfd55a4459ffff
fffff020000000000000000003776a9142291d2bc7aee4c4c591bfc98d3364f5dd8cb61688ac
1c73706b6fe183ef5762110b442ab2da826a0f61b160e3160000000000750000000000000000
01976a9142291d2bc7aee4c4c591bfc98d3364f5dd8cb61688ac00000000"
},
{
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : 0.00000000
],
 "items" : [
],
 "data" : [
],
 "confirmations" : 11,
 "blockhash" :
"00f7715590cc142ebb8865242b5cfc84832483d776a4b4c2b286bce11199d210",
 "blockindex" : 1,
 "blocktime" : 1541597810,
 "txid" :
"65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310",
 "valid" : true,
 "time" : 1541597789,
 "timereceived" : 1541597789,
 "vin" : [
 {
 "txid" :
"e6d8e7218e938bad049c1f276d27724bdc03e4ad25727887a06de721f89c2f29",
 "vout" : 1,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
]
 }
],
 "vout" : [
 {
 "n" : 0,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 }
]
}

```

```

 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
},
{
 "n" : 1,
 "addresses" : [
],
 "type" : "nulldata",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
},
{
 "n" : 2,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
}
],
"hex" :
"0100000001292f9cf821e76da087787225ade403dc4b72276d271f9c04ad8b938e21e7d8e6
010000006a47304402205fa0af0c6fe1378ac191e1c1f02b4ca79f9d1bdfe4f8121f3051ca7
c4920dad9022057ee2417ef974c87c33e9be761e53c15a640d8e83150cde060cea78ec15dd3
2e012103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9fffff
fffff03000000000000000000003776a9143aaa622500ef363a9697343cd268c21da3de8b3988ac
1c73706b6fe183ef5762110b442ab2da826a0f61b10000000000000007500000000000000000000
0331473706b65e183ef5762110b442ab2da826a0f61b1751a73706b7501617070726f7661c
000b68656164206f6666696365756a000000000000000001976a9143aaa622500ef363a96973
43cd268c21da3de8b3988ac00000000"
}
]

```

Usando ahora `getassettransaction` en nodo 1:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain help getassettransaction
{"method": "help", "params": ["getassettransaction"], "id": "66505907-1541599465", "chain_name": "DemoChain"}
```

```
getassettransaction "asset-identifier" "txid" (verbose)
```

Retrieves a specific transaction txid involving asset.

Arguments:

1. `"asset-identifier"` (string, required) Asset identifier - one of the following: asset txid, asset reference, asset name.
2. `"txid"` (string, required) The transaction id
3. `verbose` (boolean, optional, default=false) If true, returns information about item transaction

Result:

```
"transaction" (object) Information about an individual transaction from the perspective of a particular asset.
```

Examples:

```
> multichain-cli DemoChain getassettransaction "myasset" "mytxid"
> multichain-cli DemoChain getassettransaction "myasset" "mytxid" true
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id": "curltest", "method": "getassettransaction", "params": ["myasset", "mytxid", false] }' -H 'content-type: text/plain;' http://127.0.0.1:7440
```

```
devel1@VBXLFD271:~$ multichain-cli DemoChain getassettransaction "GBP" "464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29" true
{"method": "getassettransaction", "params": [{"GBP", "464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29", true}, {"id": "99258538-1541599631", "chain_name": "DemoChain"}]
```

```
{
 "addresses" : {
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : 15000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 22,
 "blockhash" :
"00341fe461262a3e671d8b13f8177eca8898184ae2df4b5d6cf1c2470fc56cd7",
 "blockindex" : 1,
 "blocktime" : 1541588274,
 "txid" :
"464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29",
 "valid" : true,
 "time" : 1541588255,
 "timereceived" : 1541588255,
 "vin" : [
```

```

{
 "txid" : "e6d8e7218e938bad049c1f276d27724bdc03e4ad25727887a06de721f89c2f29",
 "vout" : 0,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
]
}
],
"vout" : [
{
 "n" : 0,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 15000.00000000,
 "type" : "issuemore"
 }
],
 "permissions" : [
],
 "items" : [
]
},
{
 "n" : 1,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : true,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
}
]
],

```

```

"hex" :
"0100000001292f9cf821e76da087787225ade403dc4b72276d271f9c04ad8b938e21e7d8e6
000000006a4730440220406150e31e6b26855c9122a09bf3d1aa993795fa218f37975cadf0b
fdd1d763d022000c3c9775bfd880cafde2e44934ef5d11297ab7fc26aab76c46985046087e1
3a0121030b57a7bdc3fa4714717fa4eeebd067051a4728b1ac5dbf6a6ac4cdfd55a4459ffff
fffff020000000000000003776a9142291d2bc7aee4c4c591bfc98d3364f5dd8cb61688ac
1c73706b6fe183ef5762110b442ab2da826a0f61b160e3160000000000750000000000000000
01976a9142291d2bc7aee4c4c591bfc98d3364f5dd8cb61688ac00000000"
}

```

En nodo 2: No hay constancia del asset **GBP**

```

DemoChain: listassettransactions GBP true
{"method":"listassettransactions","params":["GBP",true],"id":"54413864-1541599949","chain_name":"DemoChain"}

error code: -703
error message:
Not subscribed to this asset

```

En nodo 2: Intentamos subscribirnos al asset **GBP**

```

DemoChain: subscribe "GBP" true
{"method":"subscribe","params":["GBP",true],"id":"64255518-1541600044","chain_name":"DemoChain"}

```

Ahora en nodo 2 pueden verse las transacciones asociadas al asset **GBP**:

```

DemoChain: listassettransactions GBP true
{"method":"listassettransactions","params":["GBP",true],"id":"35300439-1541600096","chain_name":"DemoChain"}

[
 {
 "addresses" : {
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : 50000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 66,
 "blockhash" :
"00ac146c77db27c731856f3bd117ca33255928f1dc45c2293c5d1e53eacca866",
 "blockindex" : 1,
 "blocktime" : 1541582643,
 "txid" :

```

```

"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "valid" : true,
 "time" : 1541582643,
 "timereceived" : 1541600044,
 "vin" : [
 {
 "txid" :
"397ed4a3dbbb78490680656004a1d9bf36a92d0ab317e5112aab5ef618fe5fd1",
 "vout" : 1,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
]
 }
],
 "vout" : [
 {
 "n" : 0,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 50000.00000000,
 "type" : "issuefirst"
 }
],
 "permissions" : [
],
 "items" : [
]
 },
 {
 "n" : 1,
 "addresses" : [
],
 "type" : "nulldata",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
 }
]
 }
}

```

```

 "items" : [
],
},
{
 "n" : 2,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
}
],
"hex" :
"0100000001d15ffe18f65eab2a11e517b30a2da936bfd9a104606580064978bbdba3d47e39
01000006a47304402206887ad99113774730cbd68a1c772f3e5f77b1fe63e241aa14993708
0b85f37ae02205f8dc1ebe7c36836a1b731c0e35fc056a0b84d8fe2d6f9c38eeb859bab823d
43012103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9ffff
fffff030000000000000000002776a9143aaa622500ef363a9697343cd268c21da3de8b3988ac
0c73706b67404b4c0000000000750000000000000000454273706b6e0100010347425000410
4640000000000201016f726967696e0002756b737461676500023031707572706f7365001070
61727473207072657061796d656e74756a00000000000000001976a9143aaa622500ef363a9
697343cd268c21da3de8b3988ac00000000"
},
{
 "addresses" : {
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : 25000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 44,
 "blockhash" :
"000872cee4372756a538d353c3f23b707f220e901951e313e15a38ca01da3589",
 "blockindex" : 1,
 "blocktime" : 1541586127,
 "txid" :
"3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89",
 "valid" : true,
 "time" : 1541586127,
 "timereceived" : 1541600045,
 "vin" : [
 {
 "txid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "vout" : 2,
 "addresses" : [

```

```
"18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
```

```
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
]
}
],
"vout" : [
{
 "n" : 0,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 25000.00000000,
 "type" : "issuemore"
 }
],
 "permissions" : [
],
 "items" : [
]
},
{
 "n" : 1,
 "addresses" : [
],
 "type" : "nulldata",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
},
{
 "n" : 2,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : false,
```

```

 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
 }
],
"hex" :
"010000000014a02362fdd13ca61927cd46a946595bde183ef5762110b442ab2da826a0f61b1
020000006a47304402207ba2ab505f6ab4464dcac785baf5f4846e5be42cb8b3f91425af606
d26ac22cc02206fde045eeaf068453dbc3552729f0818ecf50df115616e192b1b68e0490abd
bb012103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9ffff
fffff030000000000000000003776a9142291d2bc7aeee4c4c591bfc98d3364f5dd8cb61688ac
1c73706b6fe183ef5762110b442ab2da826a0f61b1a025260000000000075000000000000000
0491473706b65e183ef5762110b442ab2da826a0f61b1753073706b75016f726967696e0006
6575726f7065737461676500023032617070726f76616c000a6465706172746d656e74756a0
00000000000000001976a9143aaa622500ef363a9697343cd268c21da3de8b3988ac000000000
"
},
{
 "addresses" : {
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : 15000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 22,
 "blockhash" :
"00341fe461262a3e671d8b13f8177eca8898184ae2df4b5d6cf1c2470fc56cd7",
 "blockindex" : 1,
 "blocktime" : 1541588274,
 "txid" :
"464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29",
 "valid" : true,
 "time" : 1541588274,
 "timereceived" : 1541600045,
 "vin" : [
 {
 "txid" :
"e6d8e7218e938bad049c1f276d27724bdc03e4ad25727887a06de721f89c2f29",
 "vout" : 0,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false
 }
],
 "vout" : [
 {

```

```

 "n" : 0,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 15000.00000000,
 "type" : "issuemore"
 }
],
 "permissions" : [
],
 "items" : [
]
},
{
 "n" : 1,
 "addresses" : [
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
}
],
"hex" :
"0100000001292f9cf821e76da087787225ade403dc4b72276d271f9c04ad8b938e21e7d8e6
000000006a4730440220406150e31e6b26855c9122a09bf3d1aa993795fa218f37975cadf0b
fdd1d763d022000c3c9775bfd880cafde2e44934ef5d11297ab7fc26aab76c46985046087e1
3a0121030b57a7bdc3fa4714717fa4eeebd067051a4728b1ac5dbf6a6ac4cdfd55a4459ffff
fffff020000000000000000003776a9142291d2bc7aee4c4c591bfcfd98d3364f5dd8cb61688ac
1c73706b6fe183ef5762110b442ab2da826a0f61b160e3160000000000750000000000000000
01976a9142291d2bc7aee4c4c591bfcfd98d3364f5dd8cb61688ac00000000"
},
{
 "addresses" : {
 "18vsVGS4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : 0.00000000
 },
 "items" : [
],
 "data" : [
],
}

```

```

 "confirmations" : 11,
 "blockhash" :
"00f7715590cc142ebb8865242b5cfc84832483d776a4b4c2b286bce11199d210",
 "blockindex" : 1,
 "blocktime" : 1541597810,
 "txid" :
"65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310",
 "valid" : true,
 "time" : 1541597810,
 "timereceived" : 1541600045,
 "vin" : [
 {
 "txid" :
"e6d8e7218e938bad049c1f276d27724bdc03e4ad25727887a06de721f89c2f29",
 "vout" : 1,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false
 }
],
 "vout" : [
 {
 "n" : 0,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
 },
 {
 "n" : 1,
 "addresses" : [
],
 "type" : "nulldata",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
 }
],
}

```

```

{
 "n" : 2,
 "addresses" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
],
 "type" : "pubkeyhash",
 "ismine" : false,
 "iswatchonly" : false,
 "amount" : 0.00000000,
 "assets" : [
],
 "permissions" : [
],
 "items" : [
]
}
],
"hex" :
"0100000001292f9cf821e76da087787225ade403dc4b72276d271f9c04ad8b938e21e7d8e6
010000006a47304402205fa0af0c6fe1378ac191e1c1f02b4ca79f9d1bdfe4f8121f3051ca7
c4920dad9022057ee2417ef974c87c33e9be761e53c15a640d8e83150cde060cea78ec15dd3
2e012103c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9ffff
fffff030000000000000000003776a9143aaa622500ef363a9697343cd268c21da3de8b3988ac
1c73706b6fe183ef5762110b442ab2da826a0f61b10000000000000000750000000000000000
0331473706b65e183ef5762110b442ab2da826a0f61b1751a73706b7501617070726f76616c
000b68656164206f6666696365756a00000000000000001976a9143aaa622500ef363a96973
43cd268c21da3de8b3988ac00000000"
}
]

```

En nodo 1: vamos a lanzar una transferencia de importe del asset **GBP** a una cuenta (en este caso la del administrador) del nodo 2:

```

devel1@VBXLF271:~$ multichain-cli DemoChain sendassetfrom
"18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
"1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" "GBP" 1000 0 "Donation"
"Mr.Palmer"
{"method":"sendassetfrom", "params":
["18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT", "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwW
w18gAg", "GBP", 1000, 0, "Donation", "Mr.Palmer"], "id":"71618777-
1541601269", "chain_name": "DemoChain"}

```

e97c40c50a14e5ba2d0d303c8915c53505849f2663caca2817987e9044d382f4

 MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	275	298	2	3	2	1	2018-10-28	9.8

## Latest Transactions

Txid	Type	Confirmation	Time
e97c40c50a14e5ba2d0d303c8915c53505849f2663caca2817987e9044d382f4	Asset	11 confirmations	< 3 minutes

## Transaction e97c40c50a...82f4

Hash	e97c40c50a14e5ba2d0d303c8915c53505849f2663caca2817987e9044d382f4
Appeared in	MultiChain DemoChain, Block 283 (2018-11-07 15:34:43)
Number of inputs	1 – jump to inputs
Number of outputs	2 – jump to outputs
Size	286 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

### Inputs

Index	Previous output	Native	From address	ScriptSig
0	b1610f6a82...:0	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	72:3045...d001 33:03c1...8e9f

### Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	1Q TZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  1000.00 units of asset GBP
1	Not yet redeemed	0	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  49000.00 units of asset GBP

## MultiChain DemoChain

### Asset Summary "GBP"

Issue Block Height	217
Issue Block Time	1541582643 (2018-11-07 10:24:03)
Issue TXID	b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a
Asset Reference	217-267-25009
Name	GBP
Addresses holding units	<a href="#">3 – jump to holders</a>
Asset Issues	<a href="#">4 – jump to issues</a>
Raw units issued	9000000
Display quantity	90000.00
Native amount sent	0
Issuer Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Issue Recipient Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT

[MultiChain JSON](#)

## Asset Issues

Txid	Issue Amount	Details	
b1610f6a...	50000.00	origin	uk
		purpose	parts prepayment
		stage	01
3b117ce4...	25000.00	approval	department
		origin	europe
		stage	02
464196be...	15000.00		
65f8b397...	0.00	approval	head office

## Asset Holders

Address	Balance
1QTZ9pGzuj4uTNyBkSYD3vjPvv1sTFwWw18gAg	1000.00 (transactions)
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	49000.00 (transactions)
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3	40000.00 (transactions)

## Transactions

Transaction	Block
b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a	217
3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133fb9	239
464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29	261
65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310	272
e97c40c50a14e5ba2d0d303c8915c53505849f2663caca2817987e9044d382f4	283

## Asset Holders

Address	Balance
1QTZ9pGzuj4uTNyBkSYD3vjPvv1sTFwWw18gAg	1000.00 (transactions)
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	49000.00 (transactions)
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3	40000.00 (transactions)

Vamos a observar el histórico de transacciones asociadas al asset **GBP** en ambos nodos:

en Nodo 1:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain listassettransactions GBP
false
{"method":"listassettransactions","params":["GBP",false],"id":"11863742-1541602973","chain_name":"DemoChain"}

[
 {
 "addresses" : {
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : 50000.000000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 77,
```

```

"blockhash" :
"00ac146c77db27c731856f3bd117ca33255928f1dc45c2293c5d1e53eacca866",
"blockindex" : 1,
"blocktime" : 1541582643,
"txid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
"valid" : true,
"time" : 1541582626,
"timereceived" : 1541582626
},
{
"addresses" : {
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : 25000.00000000
},
"items" : [
],
"data" : [
],
"confirmations" : 55,
"blockhash" :
"000872cee4372756a538d353c3f23b707f220e901951e313e15a38ca01da3589",
"blockindex" : 1,
"blocktime" : 1541586127,
"txid" :
"3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89",
"valid" : true,
"time" : 1541586104,
"timereceived" : 1541586104
},
{
"addresses" : {
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : 15000.00000000
},
"items" : [
],
"data" : [
],
"confirmations" : 33,
"blockhash" :
"00341fe461262a3e671d8b13f8177eca8898184ae2df4b5d6cf1c2470fc56cd7",
"blockindex" : 1,
"blocktime" : 1541588274,
"txid" :
"464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29",
"valid" : true,
"time" : 1541588255,
"timereceived" : 1541588255
},
{
"addresses" : {
 "18vsVGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : 0.00000000
},
"items" : [
],
"data" : [
]
}

```

```

],
 "confirmations" : 22,
 "blockhash" :
"00f7715590cc142ebb8865242b5fcfc84832483d776a4b4c2b286bce11199d210",
 "blockindex" : 1,
 "blocktime" : 1541597810,
 "txid" :
"65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310",
 "valid" : true,
 "time" : 1541597789,
 "timereceived" : 1541597789
 },
 {
 "addresses" : {
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" : 1000.00000000,
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : -1000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 11,
 "blockhash" :
"000c12eb8303332f75e1c18a550c3fc5cadeed8abaee0ed21da2a6dc609234e6",
 "blockindex" : 1,
 "blocktime" : 1541601283,
 "txid" :
"e97c40c50a14e5ba2d0d303c8915c53505849f2663caca2817987e9044d382f4",
 "valid" : true,
 "time" : 1541601269,
 "timereceived" : 1541601269,
 "comment" : "Donation",
 "to" : "Mr.Palmer"
 }
]

```

en Nodo 2:

```

devel1@VBXLFD272:~$ multichain-cli DemoChain listassettransactions GBP
false
{"method":"listassettransactions","params":["GBP",false],"id":"70660830-1541603113","chain_name":"DemoChain"}

[
 {
 "addresses" : {
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : 50000.00000000
 },
 "items" : [
],
 "data" : [
],

```

```

 "confirmations" : 77,
 "blockhash" :
"00ac146c77db27c731856f3bd117ca33255928f1dc45c2293c5d1e53eacca866",
 "blockindex" : 1,
 "blocktime" : 1541582643,
 "txid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "valid" : true,
 "time" : 1541582643,
 "timereceived" : 1541600044
},
{
 "addresses" : {
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : 25000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 55,
 "blockhash" :
"000872cee4372756a538d353c3f23b707f220e901951e313e15a38ca01da3589",
 "blockindex" : 1,
 "blocktime" : 1541586127,
 "txid" :
"3b117ce4a04585572d36cb231a0cf3cf81c041637ef63e9042f1777f38133f89",
 "valid" : true,
 "time" : 1541586127,
 "timereceived" : 1541600045
},
{
 "addresses" : {
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : 15000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 33,
 "blockhash" :
"00341fe461262a3e671d8b13f8177eca8898184ae2df4b5d6cf1c2470fc56cd7",
 "blockindex" : 1,
 "blocktime" : 1541588274,
 "txid" :
"464196be7d676a0d236ba6eb9dc7298803eb9183204605e6a16bb3bca1f8ec29",
 "valid" : true,
 "time" : 1541588274,
 "timereceived" : 1541600045
},
{
 "addresses" : {
 "18vsVGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : 0.00000000
 },
 "items" : [
],

```

```

 "data" : [
],
 "confirmations" : 22,
 "blockhash" :
"00f7715590cc142ebb8865242b5cf84832483d776a4b4c2b286bce11199d210",
 "blockindex" : 1,
 "blocktime" : 1541597810,
 "txid" :
"65f8b3971f3451a171dd549b3a6a8617a531b38897775d1d4f73c95af3a1c310",
 "valid" : true,
 "time" : 1541597810,
 "timereceived" : 1541600045
},
{
 "addresses" : {
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" : 1000.00000000,
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : -1000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 11,
 "blockhash" :
"000c12eb8303332f75e1c18a550c3fc5cadeed8abaee0ed21da2a6dc609234e6",
 "blockindex" : 1,
 "blocktime" : 1541601283,
 "txid" :
"e97c40c50a14e5ba2d0d303c8915c53505849f2663caca2817987e9044d382f4",
 "valid" : true,
 "time" : 1541601269,
 "timereceived" : 1541601269
}
]

```

Se observa el mismo histórico de transacciones en ambos nodos.

**SIN EMBARGO** Vamos a observar los balances en ambos nodos:

#### Asset Holders

Address	Balance
1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	1000.00 (transactions)
18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT	49000.00 (transactions)
15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3	40000.00 (transactions)

en nodo 1:

```

devel1@VBXLFD271:~$ multichain-cli DemoChain getmultibalances "*" GBP
{"method":"getmultibalances","params":["*","GBP"],"id":"86223256-1541601894","chain_name":"DemoChain"}

```

{

```
"15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 40000.00000000
 }
],
"18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 49000.00000000
 }
],
"total" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 89000.00000000
 }
]
}
```

**UNICAMENTE** se observan los balances de las direcciones existentes en el wallet del **nodo 1**

en nodo 2:

```
devel1@VBXLF272:~$ multichain-cli DemoChain getmultibalances "*" GBP
{"method":"getmultibalances","params":["*","GBP"],"id":"71404154-1541603286","chain_name":"DemoChain"}

{
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
 }
],
 "total" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
 }
]
}
```

**UNICAMENTE** se observan los balances de las direcciones existentes en el wallet del **nodo 2**

Vamos a probar a utilizar **importaddress** (*Adds an address or script (in hex) that can be watched as if it were in your wallet but cannot be used to spend*) en ambos nodos y ver que ocurre:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain help importaddress
{"method": "help", "params": ["importaddress"], "id": "70613192-1541604160", "chain_name": "DemoChain"}
```

`importaddress address(es) ( "label" rescan )`

Adds an address or script (`in` hex) that can be watched as `if` it were `in` your wallet but cannot be used to spend.

Arguments:

1. `"address(es)"` (string, required) The addresses, comma delimited  
or
1. `address(es)` (array, optional) A json array of addresses
2. `"label"` (string, optional, default="") An optional label
3. `rescan` (boolean or `integer`, optional, default=`true`) Rescan the wallet `for` transactions.  
If `integer` rescan from block, `if` negative - from the end.

Note: This call can take minutes to complete `if` rescan is `true`.

Result:

Examples:

Import an address with rescan

```
> multichain-cli DemoChain importaddress
"1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd"
```

Import using a label without rescan

```
> multichain-cli DemoChain importaddress
"1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd" "testing" false
```

As a JSON-RPC call

```
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id": "curltest", "method": "importaddress", "params": ["1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd", "testing", false] }' -H 'content-type: text/plain;' http://127.0.0.1:7440
```

En nodo 1:

```
devel1@VBXLFD271:~$ multichain-cli DemoChain importaddress
"1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" "Admin of Node 2" true
{"method": "importaddress", "params": ["1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg", "Admin of Node 2", true], "id": "97782837-1541604548", "chain_name": "DemoChain"}
```

```
devel1@VBXLFD271:~$ multichain-cli DemoChain listaddresses "*" true
{"method": "listaddresses", "params": ["*", true], "id": "53976908-1541604653", "chain_name": "DemoChain"}
```

```

{
 "address" : "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt",
 "ismine" : true,
 "iswatchonly" : false,
 "isscript" : false,
 "pubkey" :
"033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8",
 "iscompressed" : true,
 "account" : "",
 "synchronized" : true
},
{
 "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
 "ismine" : true,
 "iswatchonly" : false,
 "isscript" : false,
 "pubkey" :
"03c19ed76e5fdfaed0554d582cf09320ba8a32a698d27a1fc8113936fea2348e9f",
 "iscompressed" : true,
 "account" : "",
 "synchronized" : true
},
{
 "address" : "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3",
 "ismine" : true,
 "iswatchonly" : false,
 "isscript" : false,
 "pubkey" :
"030b57a7bdc3fa4714717fa4eeebd067051a4728b1ac5dbf6a6ac4cdfd55a4459f",
 "iscompressed" : true,
 "account" : "",
 "synchronized" : true
},
{
 "address" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
 "ismine" : false,
 "iswatchonly" : true,
 "isscript" : false,
 "account" : "Admin of Node 2",
 "synchronized" : true
}
]

```

NOTA: obsérvese el parámetro "iswatchonly" : true, para la dirección "address" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" importada del Nodo 2.

## MultiChain Demo – DemoChain Nodo 1

[Node](#)   [Permissions](#)   [Issue Asset | Update](#)   [Send](#)   [Create Offer | Accept](#)   [Create Stream](#)   [Publish](#)   [View Streams](#)

## My Node

Name	DemoChain
Version	1.0.6
Protocol	10011
Node address	DemoChain@10.0.2.15:7441
Blocks	293
Peers	1

## My Addresses

Label	AdminMaster - <a href="#">change label</a>
Address	IWLH5fhAqmJDAnSmP2o5VwbxK7h3Uouf39qHt
Permissions	connect, send, receive, issue, create, mine, admin, activate – <a href="#">change</a>

Label	NewAddress01 - <a href="#">change label</a>
Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Permissions	connect, send, receive, issue, create – <a href="#">change</a>

## Connected Nodes

Node IP address	192.168.135.4
Handshake address	IQTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
Latency	0.040 sec

Label	<a href="#">Set label</a>
Address	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
Permissions	send, receive – <a href="#">change</a>

  

Label	AdminNode1
Address	IQTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg (watch-only)
Permissions	connect, send, receive – <a href="#">change</a>

[Get new address](#)

En nodo 2:

```
devel1@VBXLFD272:~$ multichain-cli DemoChain importaddress
"18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" "Demo user 01 from Node 1" true
{"method": "importaddress", "params":
["18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT", "Demo user 01 from Node
1", true], "id": "41128218-1541605446", "chain_name": "DemoChain"}
```

```
devel1@VBXLFD272:~$ multichain-cli DemoChain importaddress
"15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" "Demo user 02 from Node 1" true
{"method": "importaddress", "params":
["15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3", "Demo user 02 from Node
1", true], "id": "91598044-1541605468", "chain_name": "DemoChain"}
```

```
devel1@VBXLFD272:~$ multichain-cli DemoChain listaddresses "*" true
{"method": "listaddresses", "params": ["*", true], "id": "99209681-
1541605484", "chain_name": "DemoChain"}
```

```
[{
 "address" : "IQTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
 "ismine" : true,
 "iswatchonly" : false,
 "isscript" : false,
 "pubkey" :
"02f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dd",
 "iscompressed" : true,
 "account" : "",
 "synchronized" : true
}, {
}
```

```

 "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
 "ismine" : false,
 "iswatchonly" : true,
 "isscript" : false,
 "account" : "Demo user 01 from Node 1",
 "synchronized" : true
},
{
 "address" : "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3",
 "ismine" : false,
 "iswatchonly" : true,
 "isscript" : false,
 "account" : "Demo user 02 from Node 1",
 "synchronized" : true
}
]

```

NOTA: obsérvese el parámetro "iswatchonly" : true, para las direcciones "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" y "address" : "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" importadas del Nodo 1.

## MultiChain Demo – DemoChain Nodo 2

Node	Permissions	Issue Asset   Update	Send	Create Offer   Accept	Create Stream	Publish	View Streams
------	-------------	----------------------	------	-----------------------	---------------	---------	--------------

My Node

Name	DemoChain
Version	1.0.6
Protocol	10011
Node address	DemoChain@10.0.2.15:7441
Blocks	293
Peers	1

My Addresses

Label	AdminNode1 – <a href="#">change label</a>
Address	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
Permissions	connect, send, receive – <a href="#">change</a>

Label	NewAddress01
Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT (watch-only)
Permissions	connect, send, receive, issue, create – <a href="#">change</a>

Address	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3 (watch-only)
Permissions	send, receive – <a href="#">change</a>

[Get new address](#)

Vamos a observar nuevamente los balances en ambos nodos:

En nodo 1: con el parámetro `includeWatchonly` a `false`

```

devel1@VBXLFD271:~$ multichain-cli DemoChain getmultibalances "*" GBP 0
false
{"method":"getmultibalances","params":["*","GBP",0,false],"id":"77807123-1541607382","chain_name":"DemoChain"}

{
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : [

```

```

 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 40000.00000000
 },
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 49000.00000000
 }
],
 "total" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 89000.00000000
 }
]
}

```

Y ahora en nodo 1: con el parámetro `includewatchonly` a true

```

devel1@VBXLF271:~$ multichain-cli DemoChain getmultibalances "*" GBP 0
true
{"method":"getmultibalances","params":[{"*","GBP",0,true],"id":"81659197-1541607441","chain_name":"DemoChain"}

{
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 40000.00000000
 }
],
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 49000.00000000
 }
],
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
 }
],
 "total" : [
 {

```

```

 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 }
]

```

Y AHORA en el nodo 2 con el parámetro `includeWatchonly` primero a `false` y luego a `true`

```

devel1@VBXLFD272:~$ multichain-cli DemoChain getmultibalances "*" GBP 0
false
{"method":"getmultibalances","params":[{"*","GBP",0,false],"id":"81033715-
1541607617","chain_name":"DemoChain"}

{
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
 }
],
 "total" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
 }
]
}
devel1@VBXLFD272:~$ multichain-cli DemoChain getmultibalances "*" GBP 0
true
{"method":"getmultibalances","params":[{"*","GBP",0,true],"id":"49494437-
1541607624","chain_name":"DemoChain"}

{
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 40000.00000000
 }
],
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 49000.00000000
 }
],
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" : [
 {
 "name" : "GBP",

```

```

 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
 }
],
"total" : [
{
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
}
]
}

```

2) Using the chain's burn address, which has no corresponding private key, to "burn" units of an asset by rendering them unspendable. The address can be obtained using `getinfo`, and any node can import it using `importaddress` to track the asset quantities burned.

## Atomic exchange transactions

---

### How to safely swap assets between counterparties

Any MultiChain transaction can have multiple inputs and outputs, and each one can relate to a different address on the blockchain. This enables a single transaction to perform an asset exchange between two or more parties, for example sending a dollar-denominated asset from Alice to Bob, while simultaneously sending a Euro-denominated asset from Bob to Alice. Because the exchange takes place in a single transaction, it comes with a guarantee of atomicity, meaning that all of the asset transfers take place simultaneously, or none take place at all. In the finance world, this type of transaction is termed `delivery-versus-payment`, or DvP for short.

### Offers to Exchange

MultiChain provides a number of APIs which make it easy to perform these exchanges. One party begins by using `preparelockunspent(from)` and `createrawexchange` to create an `offer of exchange`, in which they specify the asset and quantity they are offering, and the asset and quantity they request in return.

This offer is represented as a `partial transaction`, with one input and one output, signed by the offering party. Unlike regular signatures which lock down the entire set of transaction inputs and outputs, an exchange offer uses a special signature type which allows other inputs and outputs to be added, so long as the original ones stay intact (the technical name is `SIGHASH_SINGLE|SIGHASH_ANYONE_CAN_PAY`).

The partial transaction representing an offer can then be sent to a specific counterparty, or distributed for anyone to review and accept. This communication can take place on the blockchain, for example using a stream, or off-chain using any method desired (even email!) Another participant receiving the offer can review it using `decoderawexchange` and then decide whether to accept it. If so, they call `preparelockunspent(from)` and `completerawexchange` to add their own input and output to the transaction, offering the requested asset and quantity and requesting the asset and quantity offered. The final transaction will then be balanced and can be broadcast to the network using `sendrawtransaction`.

## more complex exchange transactions

The same mechanism can also be used to create more complex exchange transactions, **in which multiple assets are offered or requested, and more than two blockchain participants are involved**. Instead of calling `completerawexchange`, a participant can use `appendrawexchange` to partially meet an offer, creating a new larger partial transaction that represents a new offer of exchange.

This new transaction can then be passed on to additional parties, who can check it with `decoderawexchange` and add their own inputs and outputs, and so on. A transaction can only be broadcast to the network (using `sendrawtransaction`) once it is balanced, meaning that the total quantities of assets in the inputs equals the total in the outputs.

MultiChain also provides the `disablerawtransaction` API to disable an offer after it has been distributed. This works so long as nobody has yet accepted the offer by extending it into a balanced transaction and broadcasting that transaction to the network. **An offer is disabled by spending the assets used in one of the offer's inputs, sending them back to their source**. At this point the offer becomes useless, because one of its inputs refers to a previously spent transaction output, which the blockchain's double-spend rules prevent from being spent again.

## TUTORIAL (Offers)

In this tutorial, we will focus on exchanges of two different assets between two or three counterparties. The tutorial requires two servers running MultiChain 1.0 beta 2 or later, both of which are connected to the same blockchain, with no native currency or other unusual parameters.

### Step 1: Issuing the assets

Let's begin by creating the two assets to be used in this tutorial. On the first server, let's find an address that can create assets:

```
DemoChain: listpermissions issue
{"method":"listpermissions","params":["issue"],"id":"73485869-1541664651","chain_name":"DemoChain"}

[
 {
 "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
 "for" : null,
 "type" : "issue",
 "startblock" : 0,
 "endblock" : 4294967295
 },
 {
 "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
 "for" : null,
 "type" : "issue",
 "startblock" : 0,
 "endblock" : 4294967295
 }
]
DemoChain: listaddresses
{"method":"listaddresses","params":[],"id":"22536507-
```

```
1541664669", "chain_name": "DemoChain"}
```

```
[
 {
 "address" : "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt",
 "ismine" : true
 },
 {
 "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
 "ismine" : true
 },
 {
 "address" : "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3",
 "ismine" : true
 },
 {
 "address" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
 "ismine" : false
 }
]
```

An address is suitable if it appears in the output of the first command, and also in the second command together with "ismine" : true.

Ejemplo: "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"

Now let's find an address belonging to the other node. On the second server (Nodo 2):

```
DemoChain: listaddresses
{ "method": "listaddresses", "params": [], "id": "69987868-
1541664850", "chain_name": "DemoChain" }

[
 {
 "address" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
 "ismine" : true
 },
 {
 "address" : "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT",
 "ismine" : false
 },
 {
 "address" : "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3",
 "ismine" : false
 }
]
```

Enter any address for which "ismine" : true is shown

Ejemplo: "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"

Now let's issue the assets to these two addresses. Back on the first server (Nodo 1):

```
DemoChain: issue 1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt USD 2000 0.01
{"method":"issue","params":
[{"1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt","USD",2000,0.01000000],"id":"3227
3509-1541666081","chain_name":"DemoChain"}
```

c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c

## MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Search

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	295	320	3	3	2	1	2018-10-28	10.6

### Latest Transactions

Txid	Type	Confirmation	Time
<a href="#">c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c</a>	Asset	4 confirmations	< 1 minute

## Transaction c01ab8282b...f58c

Hash	c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c
Appeared in	MultiChain DemoChain, Block 294 (2018-11-08 09:34:51)
Number of inputs	1 – jump to inputs
Number of outputs	3 – jump to outputs
Size	270 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

### Inputs

Index	Previous output	Native	From address	ScriptSig
0	<a href="#">65f8b3971f...:2</a>	0	<a href="#">18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT</a>	72:3045...3801 33:03c1...8e9f

### Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey						
0	Not yet redeemed	0	<a href="#">1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt</a>	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 12:7370...0000 DROP						
				Issue 200000 raw units of new asset						
1	Not yet redeemed	0	None	18:7370...0000 DROP RETURN						
				New Issuance Metadata: <table border="1"><tr><td>Asset name</td><td>USD</td></tr><tr><td>Open to follow-on issuance</td><td>False</td></tr><tr><td>Quantity multiple</td><td>100</td></tr></table>	Asset name	USD	Open to follow-on issuance	False	Quantity multiple	100
Asset name	USD									
Open to follow-on issuance	False									
Quantity multiple	100									
2	Not yet redeemed	0	<a href="#">18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT</a>	DUP HASH160 20:3aaa...8b39 EQUALVERIFY CHECKSIG						

NOTA: ADVIERTASE que al no haber utilizado [issuefrom](#)

[1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg](#)

[1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg](#) ... se ha tomado como input la dirección

[18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT](#) utilizada en el tutorial anterior

```

DemoChain: listassets USD true
{"method":"listassets","params":["USD",true],"id":"87190341-1541667168","chain_name":"DemoChain"}

[
 {
 "name" : "USD",
 "issuetxid" :
"c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c",
 "assetref" : "294-266-6848",
 "multiple" : 100,
 "units" : 0.01000000,
 "open" : false,
 "details" : {
 },
 "issueqty" : 2000.00000000,
 "issueraw" : 200000,
 "subscribed" : false,
 "issues" : [
 {
 "txid" :
"c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c",
 "qty" : 2000.00000000,
 "raw" : 200000,
 "details" : {
 },
 "issuers" : [
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"
]
 }
]
 }
]

```

**OBSERVESE** que figura como `issuer --> "issuers" : [ "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT"]`

```

DemoChain: gettotalbalances
{"method":"gettotalbalances","params":[],"id":"47772301-1541667729","chain_name":"DemoChain"}

[
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 89000.00000000
 },
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 775.00000000
 },
 {

```

```

 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
 }
]

```

```

DemoChain: subscribe "USD"
{"method":"subscribe","params":["USD"],"id":"78251742-1541667783","chain_name":"DemoChain"}

DemoChain: listassettransactions USD
{"method":"listassettransactions","params":["USD"],"id":"43169185-1541667899","chain_name":"DemoChain"}

[
{
 "addresses" : {
 "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt" : 2000.00000000
 },
 "items" : [
],
 "data" : [
],
 "confirmations" : 11,
 "blockhash" :
"00e152696f111a6a7c9077bcecfcc18587db97f581b6b4d37043a8aab1218db67",
 "blockindex" : 1,
 "blocktime" : 1541666091,
 "txid" :
"c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c",
 "valid" : true,
 "time" : 1541666081,
 "timereceived" : 1541666081
}
]

```

NOTA: para visualizar el estado del asset en "Multichain Explorer" se usa la url <http://localhost:2750/MultiChain%20DemoChain/assetref/294-266-6848> donde La referencia del asset ( "assetref" : "294-266-6848", ) se obtiene por ejemplo como información de respuesta de los comandos `listassets USD true` o `gettotalbalances`

 MultiChain DemoChain

## Asset Summary "USD"

Issue Block Height	294
Issue Block Time	1541666091 (2018-11-08 09:34:51)
Issue TxID	c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c
Asset Reference	294-266-6848
Name	USD
Addresses holding units	1 – jump to holders
Asset Issues	1 – jump to issues
Raw units issued	200000
Display quantity	2000.00
Native amount sent	0
Issuer Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAve7EBT
Issue Recipient Address	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt

[MultiChain JSON](#)

## Asset Issues

Txid	Issue Amount	Details
c01ab828...	2000.00	

## Asset Holders

Address	Balance
1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt	2000.00 (transactions)

## Transactions

Transaction	Block
c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c	294

Now let's issue another asset to the second node's address, after granting it the necessary permissions.  
Still on the first server:

```
DemoChain: grant 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg receive,send
{"method":"grant","params":
["1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg","receive,send"],"id":"98185593-1541668743","chain_name":"DemoChain"}
```

```
6956db1a32cc909a48120541b10823a2c5869b472bae261668c07a0ca74ae1dd
```

```
DemoChain: issuefrom 1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg JPY 50000 1
{"method":"issuefrom","params":
["1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt","1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg","JPY",50000,1],"id":"45979881-1541668967","chain_name":"DemoChain"}
```

```
70f97f9506bde139d0c17b2cbe0e8a697b77f080187e89ba7cf8b7bc27169ca2
```

# MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Search

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	326	353	4	3	2	1	2018-10-28	10.8

## Latest Transactions

Txid	Type	Confirmation	Time
70f97f9506bde139d0c17b2cbe0e8a697b77f080187e89ba7cf8b7bc27169ca2	Asset	11 confirmations	< 2 hours

## Transaction 70f97f9506...9ca2

Hash	70f97f9506bde139d0c17b2cbe0e8a697b77f080187e89ba7cf8b7bc27169ca2
Appeared in	MultiChain DemoChain, Block 316 (2018-11-08 10:23:05)
Number of inputs	1 – jump to inputs
Number of outputs	3 – jump to outputs
Size	269 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

### Inputs

Index	Previous output	Native	From address	ScriptSig
0	6956db1a32...:1	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	71:3044...5001 33:0339...43c8

### Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 12:7370...0000 DROP
				Issue 50000 raw units of new asset
1	Not yet redeemed	0	None	18:7370...0000 DROP RETURN
				New Issuance Metadata: Asset name JPY Open to follow-on issuance False Quantity multiple 1
2	Not yet redeemed	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG

Now let's check the assets are visible. On both servers:

En nodo 1:

```
DemoChain: listassets
{"method": "listassets", "params": [], "id": "96770339-1541677865", "chain_name": "DemoChain"}

[
 {
 "name" : "asset1",
 "issuetxid" :
"259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c",
 "assetref" : "167-266-39973",
 }]
```

```

"multiple" : 100,
"units" : 0.01000000,
"open" : false,
"details" : {
},
"issueqty" : 1000.00000000,
"issueraw" : 100000,
"subscribed" : false
},
{
"name" : "GBP",
"issuetxid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
"assetref" : "217-267-25009",
"multiple" : 100,
"units" : 0.01000000,
"open" : true,
"details" : {
 "origin" : "uk",
 "stage" : "01",
 "purpose" : "parts prepayment"
},
"issueqty" : 90000.00000000,
"issueraw" : 9000000,
"subscribed" : true,
"synchronized" : true,
"transactions" : 5,
"confirmed" : 5
},
{
"name" : "USD",
"issuetxid" :
"c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c",
"assetref" : "294-266-6848",
"multiple" : 100,
"units" : 0.01000000,
"open" : false,
"details" : {
},
"issueqty" : 2000.00000000,
"issueraw" : 200000,
"subscribed" : true,
"synchronized" : true,
"transactions" : 1,
"confirmed" : 1
},
{
"name" : "JPY",
"issuetxid" :
"70f97f9506bde139d0c17b2cbe0e8a697b77f080187e89ba7cf8b7bc27169ca2",
"assetref" : "316-266-63856",
"multiple" : 1,
"units" : 1.00000000,
"open" : false,
"details" : {
}

```

```

 },
 "issueqty" : 50000.00000000,
 "issueraw" : 50000,
 "subscribed" : false
 }
]

```

En nodo 2:

```

DemoChain: listassets
{"method":"listassets","params":[],"id":"83987858-1541677961","chain_name":"DemoChain"}

[
{
 "name" : "asset1",
 "issuetxid" :
"259c3624dd8fe7c366dcf9e8ec7c2b9d5da95c5af2e3242a5291cdf9576f816c",
 "assetref" : "167-266-39973",
 "multiple" : 100,
 "units" : 0.01000000,
 "open" : false,
 "details" : {
 },
 "issueqty" : 1000.00000000,
 "issueraw" : 100000,
 "subscribed" : false
},
{
 "name" : "GBP",
 "issuetxid" :
"b1610f6a82dab22a440b116257ef83e1bd9565946ad47c9261ca13dd2f36024a",
 "assetref" : "217-267-25009",
 "multiple" : 100,
 "units" : 0.01000000,
 "open" : true,
 "details" : {
 "origin" : "uk",
 "stage" : "01",
 "purpose" : "parts prepayment"
 },
 "issueqty" : 90000.00000000,
 "issueraw" : 9000000,
 "subscribed" : true,
 "synchronized" : true,
 "transactions" : 5,
 "confirmed" : 5
},
{
 "name" : "USD",
 "issuetxid" :
"c01ab8282b32adc7133375501fe099d02c589326ebfede45aadba8531a9ff58c",

```

```

"assetref" : "294-266-6848",
"multiple" : 100,
"units" : 0.01000000,
"open" : false,
"details" : {
},
"issueqty" : 2000.00000000,
"issueraw" : 200000,
"subscribed" : false
},
{
"name" : "JPY",
"issuetxid" :
"70f97f9506bde139d0c17b2cbe0e8a697b77f080187e89ba7cf8b7bc27169ca2",
"assetref" : "316-266-63856",
"multiple" : 1,
"units" : 1.00000000,
"open" : false,
"details" : {
},
"issueqty" : 50000.00000000,
"issueraw" : 50000,
"subscribed" : false
}
]

```

En [Multichain Explorer](#) (recordar "assetref" : "316-266-63856")

## MultiChain DemoChain

### Asset Summary "JPY"

Issue Block Height	316
Issue Block Time	1541668985 (2018-11-08 10:23:05)
Issue TXID	70f97f9506bde139d0c17b2cbe0e8a697b77f080187e89ba7cf8b7bc27169ca2
Asset Reference	316-266-63856
Name	JPY
Addresses holding units	<a href="#">1 – jump to holders</a>
Asset Issues	<a href="#">1 – jump to issues</a>
Raw units issued	50000
Display quantity	50000
Native amount sent	0
Issuer Address	<a href="#">1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt</a>
Issue Recipient Address	<a href="#">1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg</a>

[MultiChain JSON](#)

## Asset Issues

Txid	Issue Amount	Details
70f97f95...	50000	

## Asset Holders

Address	Balance
1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	50000 (transactions)

## Transactions

Transaction	Block
70f97f9506bde139d0c17b2cbe0e8a697b77f080187e89ba7cf8b7bc27169ca2	316

Both servers should show the **USD** asset issued with **2000 units (dollars)**, each divisible into 100 sub-units (cents), and the **JPY** asset with **50000 units (yen)** that cannot be sub-divided. Now let's check each server's balance:

En nodo 1 (Recuérdese que con anterioridad ya se hizo `multichain-cli DemoChain importaddress "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" "Admin of Node 2" true`):

```
DemoChain: gettotalbalances 0
{"method":"gettotalbalances","params":[0],"id":"82519422-1541678533","chain_name":"DemoChain"}
```

```
[{
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 89000.00000000
},
{
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 775.00000000
},
{
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
}]
```

```
DemoChain: subscribe "JPY"
{"method":"subscribe","params":["JPY"],"id":"12912671-1541678589","chain_name":"DemoChain"}
```

```
DemoChain: gettotalbalances 0
{"method":"gettotalbalances","params":[0],"id":"30568094-1541678593","chain_name":"DemoChain"}
```

```
[{
 "name" : "GBP",
 "assetref" : "217-267-25009",
```

```

 "qty" : 89000.00000000
},
{
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 775.00000000
},
{
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
}
]

```

NOTA el asset **JPY** sigue sin aparecer. Es necesario realizar la invocación con el parámetro **includeWatchonly** a **true**:

```

DemoChain: gettotalbalances 0 true
{"method":"gettotalbalances","params":[0,true],"id":"89247586-1541678869","chain_name":"DemoChain"}

[
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 1000.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 50000.00000000
 },
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
 }
]

```

En nodo 2 (Recuérdese que con anterioridad ya se hizo **multichain-cli DemoChain importaddress "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" "Demo user 01 from Node 1"** **true** pero hará falta igualmente realizar **multichain-cli DemoChain importaddress "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt" "Admin User from Node 1"** **true**):

```

DemoChain: gettotalbalances 0 true
{"method":"gettotalbalances","params":[0,true],"id":"90643455-1541679399","chain_name":"DemoChain"}

[
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 225.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 50000.00000000
 }
]

DemoChain: importaddress "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt" "Admin User from Node 1" true
{"method":"importaddress","params": ["1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt", "Admin User from Node 1", true], "id":"47128775-1541679432", "chain_name":"DemoChain" }

DemoChain: gettotalbalances 0 true
{"method":"gettotalbalances","params":[0,true],"id":"30956349-1541679485","chain_name":"DemoChain" }

[
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 1000.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 50000.00000000
 },
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
 }
]

```

## Simple atomic exchange

Now we'll perform a simple atomic exchange, in which 100 dollars belonging to the first node are exchanged for 10500 yen belonging to the second.

On the second server (Nodo 2), let's create a locked transaction output containing 10500 yen:

En nodo 2:

```
DemoChain: preparelockunspentfrom 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
'{"JPY":10500}'
{"method":"preparelockunspentfrom","params":
["1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg", {"JPY":10500}], "id":"62345244-
1541680000", "chain_name":"DemoChain"}

{
 "txid" :
"6f57087c00cb55b79feb1afc89879daf540218d0b90d07c41f7214a8e3f485ef",
 "vout" : 0
}

DemoChain: listlockunspent
{"method":"listlockunspent","params":[], "id":"80465636-
1541686486", "chain_name":"DemoChain"}

[
 {
 "txid" :
"6f57087c00cb55b79feb1afc89879daf540218d0b90d07c41f7214a8e3f485ef",
 "vout" : 0
 }
]
```

## MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	329	357	4	3	2	1	2018-10-28	10.8

### Latest Transactions

Txid	Type	Confirmation	Time
<a href="#">6f57087c00cb55b79feb1afc89879daf540218d0b90d07c41f7214a8e3f485ef</a>	Asset	4 confirmations	< 1 minute

 Transaction 6f57087c00...85ef

Hash	6f57087c00cb55b79feb1afc89879daf540218d0b90d07c41f7214a8e3f485ef
Appeared in	MultiChain DemoChain, Block 327 (2018-11-08 13:26:55)
Number of inputs	1 – jump to inputs
Number of outputs	2 – jump to outputs
Size	286 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

## Inputs

Index	Previous output	Native	From address	ScriptSig
0	70f97f9506...0	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	72:3045...3a01 33:02f2...73dd

## Inputs

Index	Previous output	Native	From address	ScriptSig
0	70f97f9506...0	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	72:3045...3a01 33:02f2...73dd

## Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 28:7370...0000 DROP
				10500 units of asset JPY
1	Not yet redeemed	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 28:7370...0000 DROP
				39500 units of asset JPY

Comprobamos saldos en Nodo 2. Primero con el parámetro `includeLocked (bool, optional, default=false) Also take locked outputs into account` a `false` (default) y luego a `true`

```
DemoChain: gettotalbalances 0 true
{"method": "gettotalbalances", "params": [0, true], "id": "92648389-1541680385", "chain_name": "DemoChain"}
```

```
[
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 1000.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 39500.00000000
 },
 {
 "name" : "USD",
 "assetref" : "316-266-63857",
 "qty" : 1000.00000000
 }]
```

```

 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
}
]

DemoChain: gettotalbalances 0 true true
{"method":"gettotalbalances","params":[0,true,true],"id":"83440636-1541680392","chain_name":"DemoChain"}
```

[

- {
- "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 1000.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 50000.00000000
 },
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
 }
]

Obsérvense los dos valores diferentes:

Considerando los importes "bloqueados" (10500 yen)

```
{
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 39500.00000000
},
```

Sin considerar los importes "bloqueados"

```
{
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 50000.00000000
},
```

## MultiChain Demo – DemoChain Nodo 2

[Node](#)   [Permissions](#)   [Issue Asset | Update](#)   [Send](#)   [Create Offer | Accept](#)   [Create Stream](#)   [Publish](#)   [View Streams](#)

## Available Balances

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	39500 (10500 locked)
<b>GBP</b>	1000

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJAJ3azfoQewotnAvE7EBT
<b>GBP</b>	49000

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s
<b>GBP</b>	40000

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
<b>asset1</b>	775
<b>USD</b>	2000

## Decode Offer

**Offer hexdecimal:**

Decode Offer

Sin embargo, en Nodo 1 el bloqueo de fondos no se ha reflejado:

```
DemoChain: gettotalbalances 0 true true
{"method":"gettotalbalances","params":[0,true,true],"id":"82885592-1541680763","chain_name":"DemoChain"}
```

```
[
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 1000.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 50000.00000000
 },
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
 }
]
```

## MultiChain Demo – DemoChain Nodo 1

[Node](#)   [Permissions](#)   [Issue Asset | Update](#)   [Send](#)   [Create Offer | Accept](#)   [Create Stream](#)   [Publish](#)   [View Streams](#)

Available Balances

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
<b>asset1</b>	775
<b>USD</b>	2000

  

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

  

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

  

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNyBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	50000
<b>GBP</b>	1000

Decode Offer

**Offer hexadecimal:**

[Decode Offer](#)

On the second server (Nodo 2), once the locked transaction has been created (containing **10500 yen**) now, because it is locked, this transaction output will be protected against spending unless explicitly spent or unlocked. Now we will use it to start the exchange transaction, specifying that we want **100 dollars** in exchange:

```
DemoChain: createrawexchange
"6f57087c00cb55b79feb1afc89879daf540218d0b90d07c41f7214a8e3f485ef" 0
'{"USD":100}'
{"method":"createrawexchange","params":
[""6f57087c00cb55b79feb1afc89879daf540218d0b90d07c41f7214a8e3f485ef",0,
 {"USD":100}],"id":"39632341-1541681259","chain_name":"DemoChain"}
```

0100000001ef85f4e3a814721fc4070db9d0180254af9d8789fc1aeb9fb755cb007c08576f0  
00000006a47304402204dbbe83d5872dbcf988051854e9e3aab19e0975d9ad9f35863ab539  
9cd398b2022006381d711e1906229f9a4f23bbba4acae52f93d8fdf7fbe965aea1ed4f70914  
4832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dfffff  
fffff01000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1  
c73706b71d099e01f50753313c7ad322b28b81ac010270000000000007500000000

NOTA: No se genera ninguna "transacción" con esta solicitud de "oferta" (la transacción última "6f57087c00cb55b79feb1afc89879daf540218d0b90d07c41f7214a8e3f485ef" es justamente la anterior `preparelockunspentfrom 1QTZ9pGzuj4uTNyBkSYD3vjPvv1sTFwWw18gAg`  
'{"JPY":10500}' )

 MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Search

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	329	357	4	3	2	1	2018-10-28	10.8

### Latest Transactions

Txid	Type	Confirmation	Time
6f57087c00cb55b79feb1afc89879daf540218d0b90d07c41f7214a8e3f485ef	Asset	4 confirmations	< 1 minute

This will output a large hexadecimal blob of text that contains the raw transaction data representing the offer of exchange. Copy this blob to the clipboard, then run this command on the first server (Nodo 1):

```
DemoChain: decoderawexchange
0100000001ef85f4e3a814721fc4070db9d0180254af9d8789fc1aeb9fb755cb007c08576f0
00000006a47304402204dbbe83d5872dbc988051854e9e3aab19e0975d9ad9f35863ab539
9cd398b2022006381d711e1906229f9a4f23bbba4acae52f93d8fdf7fbe965aea1ed4f70914
4832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddffff
fffff0100000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1
c73706b71d099e01f50753313c7ad322b28b81ac0102700000000000007500000000
{"method": "decoderawexchange", "params": [
["0100000001ef85f4e3a814721fc4070db9d0180254af9d8789fc1aeb9fb755cb007c08576
f00000006a47304402204dbbe83d5872dbc988051854e9e3aab19e0975d9ad9f35863ab5
399cd398b2022006381d711e1906229f9a4f23bbba4acae52f93d8fdf7fbe965aea1ed4f709
144832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
fffff0100000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488a
c1c73706b71d099e01f50753313c7ad322b28b81ac010270000000000007500000000"], "id": "81133663-1541685098", "chain_name": "DemoChain"}}

{
 "offer" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 10500.00000000
 }
]
 },
 "ask" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 100.00000000
 }
]
 },
 "requiredfee" : 0.00000000,
 "candisable" : false,
```

```

 "cancomplete" : true,
 "complete" : false
}

```

The output will show exactly what is represented by this exchange offer in the **offer** and **ask** sections. In addition, **cancomplete** should be **true** meaning that the first node has the assets required to complete the exchange.

Now create a locked transaction output containing 100 dollars, still on the first server (Nodo 1):

```

DemoChain: preparelockunspentfrom 1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
'{"USD":100}'
{"method":"preparelockunspentfrom","params":
[{"1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt":{"USD":100}],"id":"69628093-
1541685274","chain_name":"DemoChain"}

{
 "txid" :
"111cccac66043db048d0f7e488a9f275811d7c40430844dd2eb01f9821688f19",
 "vout" : 0
}

DemoChain: listlockunspent
{"method":"listlockunspent","params":[],"id":"78517187-
1541686437","chain_name":"DemoChain"}

[
 {
 "txid" :
"111cccac66043db048d0f7e488a9f275811d7c40430844dd2eb01f9821688f19",
 "vout" : 0
 }
]

```

## MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	348	377	4	3	2	1	2018-10-28	10.9

### Latest Transactions

Txid	Type	Confirmation	Time
111cccac66043db048d0f7e488a9f275811d7c40430844dd2eb01f9821688f19	Asset	11 confirmations	< 2 minutes

 Transaction 111cccac66...8f19

Hash	111cccac66043db048d0f7e488a9f275811d7c40430844dd2eb01f9821688f19
Appeared in	MultiChain DemoChain, Block 338 (2018-11-08 14:54:42)
Number of inputs	1 – jump to inputs
Number of outputs	2 – jump to outputs
Size	285 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

## Inputs

Index	Previous output	Native	From address	ScriptSig
0	c01ab8282b...0	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	71:3044...4001 33:0339...43c8

## Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  100.00 units of asset <a href="#">USD</a>
1	Not yet redeemed	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  1900.00 units of asset <a href="#">USD</a>

```
DemoChain: gettotalbalances 0 true false
{"method":"gettotalbalances","params":[0,true,false],"id":"31270302-1541685317","chain_name":"DemoChain"}
```

```
[
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 1900.00000000
 },
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 1000.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 50000.00000000
 }
]
```

```
DemoChain: gettotalbalances 0 true true
{"method":"gettotalbalances","params":[0,true,true],"id":"46382258-1541685322","chain_name":"DemoChain"}
```

```
[
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
 },
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 1000.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 50000.00000000
 }
]
```

En Nodo 2: veamos cómo se reflejan los saldos y observemos las diferencias:

```
DemoChain: gettotalbalances 0 true true
{"method":"gettotalbalances","params":[0,true,true],"id":"36752542-1541685886","chain_name":"DemoChain"}

[
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
 },
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 1000.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 50000.00000000
 }
]
DemoChain: gettotalbalances 0 true false
{"method":"gettotalbalances","params":[0,true,false],"id":"59203390-
```

```
1541685893", "chain_name": "DemoChain"}
```

```
[
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 2000.00000000
 },
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 1000.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 90000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 39500.00000000
 }
]
```

Como puede observarse dependiendo donde se "emitió" ("issue") el asset se refleja su saldo correctamente tanto si se consideran o no los importes "bloqueados":

## MultiChain Demo – DemoChain Nodo 1

<a href="#">Node</a>	<a href="#">Permissions</a>	<a href="#">Issue Asset   Update</a>	<a href="#">Send</a>	<a href="#">Create Offer   Accept</a>	<a href="#">Create Stream</a>	<a href="#">Publish</a>	<a href="#">View Streams</a>
----------------------	-----------------------------	--------------------------------------	----------------------	---------------------------------------	-------------------------------	-------------------------	------------------------------

Available Balances

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
<b>USD</b>	1900 (100 locked)
<b>asset1</b>	775

  

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

  

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

  

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNVBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	50000
<b>GBP</b>	1000

Decode Offer

**Offer hexdecimal:**

**Decode Offer**

## MultiChain Demo – DemoChain Nodo 2

[Node](#)   [Permissions](#)   [Issue Asset | Update](#)   [Send](#)   [Create Offer | Accept](#)   [Create Stream](#)   [Publish](#)   [View Streams](#)

Available Balances

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	39500 (10500 locked)
<b>GBP</b>	1000

  

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvG54YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

  

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

  

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
<b>USD</b>	2000
<b>asset1</b>	775

Decode Offer

Offer hexdecimal:

[Decode Offer](#)

Now we will add to the exchange transaction, in order to complete it, confirming that we accept 10500 yen in exchange:

```

DemoChain: appendrawexchange
"0100000001ef85f4e3a814721fc4070db9d0180254af9d8789fc1aeb9fb755cb007c08576f
000000006a47304402204dbbe83d5872dbc988051854e9e3aab19e0975d9ad9f35863ab53
99cd398b2022006381d711e1906229f9a4f23bbba4acae52f93d8fdf7fbe965aea1ed4f7091
44832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddfff
fffff010000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac
1c73706b71d099e01f50753313c7ad322b28b81ac010270000000000007500000000"
"111cccc66043db048d0f7e488a9f275811d7c40430844dd2eb01f9821688f19" 0
'{"JPY":10500}'
{"method":"appendrawexchange", "params":
["0100000001ef85f4e3a814721fc4070db9d0180254af9d8789fc1aeb9fb755cb007c08576
f00000006a47304402204dbbe83d5872dbc988051854e9e3aab19e0975d9ad9f35863ab5
399cd398b2022006381d711e1906229f9a4f23bbba4acae52f93d8fdf7fbe965aea1ed4f709
144832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
fffff010000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488a
c1c73706b71d099e01f50753313c7ad322b28b81ac010270000000000007500000000", "111
cccc66043db048d0f7e488a9f275811d7c40430844dd2eb01f9821688f19", 0,
{"JPY":10500}], "id": "94694289-1541688762", "chain_name": "DemoChain"}}

{
 "hex" :
"0100000002ef85f4e3a814721fc4070db9d0180254af9d8789fc1aeb9fb755cb007c08576f
000000006a47304402204dbbe83d5872dbc988051854e9e3aab19e0975d9ad9f35863ab53
99cd398b2022006381d711e1906229f9a4f23bbba4acae52f93d8fdf7fbe965aea1ed4f7091
44832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddfff
fffff198f6821981fb02edd440843407c1d8175f2a988e4f7d048b03d0466accc1c11000000
006b483045022100940ec5fb506f367dc853d9ec06d32d9a7731b5bddff3c4763d01c4f18b2

```

```

 dda500220769ce85446c853e24b142bd79334d223f277634bdb8e5c5f758cc251d2668b5283
 21033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
 f020000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c73
 706b71d099e01f50753313c7ad322b28b81ac01027000000000007500000000000000000000377
 6a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d0
 39e1bd06957ff9700429000000000007500000000",
 "complete" : true
}

```

The output should contain an even longer hexadecimal blob of text, alongside another field complete whose value is true. This means that the transaction is fully signed and ready for broadcast and confirmation. (We could also have used completerawexchange here, but we'll get to that later on.) Copy the longer blob of hexadecimal and run: `sendrawtransaction [paste-longer-hex-blob]`

```

DemoChain: sendrawtransaction
"0100000002ef85f4e3a814721fc4070db9d0180254af9d8789fc1aeb9fb755cb007c08576f
000000006a47304402204dbbe83d5872dbc988051854e9e3aab19e0975d9ad9f35863ab53
99cd398b2022006381d711e1906229f9a4f23bbba4acae52f93d8fdf7fbe965aea1ed4f7091
44832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddffff
fffff198f6821981fb02edd440843407c1d8175f2a988e4f7d048b03d0466accc1c11000000
006b483045022100940ec5fb506f367dc853d9ec06d32d9a7731b5bddff3c4763d01c4f18b2
dda500220769ce85446c853e24b142bd79334d223f277634bdb8e5c5f758cc251d2668b5283
21033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
f020000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c73
706b71d099e01f50753313c7ad322b28b81ac01027000000000007500000000000000000000377
6a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d0
39e1bd06957ff9700429000000000007500000000"
{"method":"sendrawtransaction","params":
["0100000002ef85f4e3a814721fc4070db9d0180254af9d8789fc1aeb9fb755cb007c08576
f000000006a47304402204dbbe83d5872dbc988051854e9e3aab19e0975d9ad9f35863ab5
399cd398b2022006381d711e1906229f9a4f23bbba4acae52f93d8fdf7fbe965aea1ed4f709
144832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
fffff198f6821981fb02edd440843407c1d8175f2a988e4f7d048b03d0466accc1c1100000
006b483045022100940ec5fb506f367dc853d9ec06d32d9a7731b5bddff3c4763d01c4f18b
2dda500220769ce85446c853e24b142bd79334d223f277634bdb8e5c5f758cc251d2668b528
321033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
ff020000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c7
3706b71d099e01f50753313c7ad322b28b81ac010270000000000075000000000000000000037
76a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d
039e1bd06957ff9700429000000000007500000000",
"id":"62977769-1541688936","chain_name":"DemoChain"}]

```

dd2b39ed59532c27cdad72d7d349cc36501dcca09eb079c272378091c2dd3450

# MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Search

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	353	383	4	3	2	1	2018-10-28	10.9

## Latest Transactions

Txid	Type	Confirmation	Time
dd2b39ed59532c27cdad72d7d349cc36501dcca09eb079c272378091c2dd3450	Asset	7 confirmations	< 1 minute

## Transaction dd2b39ed59...3450

Hash	dd2b39ed59532c27cdad72d7d349cc36501dcca09eb079c272378091c2dd3450
Appeared in	MultiChain DemoChain, Block 349 (2018-11-08 15:55:56)
Number of inputs	2 – <a href="#">jump to inputs</a>
Number of outputs	2 – <a href="#">jump to outputs</a>
Size	433 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

## Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	<a href="#">1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg</a>	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 28:7370...0000 DROP
				100.00 units of asset <a href="#">USD</a>
1	Not yet redeemed	0	<a href="#">1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt</a>	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 28:7370...0000 DROP
				10500 units of asset <a href="#">JPY</a>

You can check the exchange was successful by running this command on both servers:

En nodo 1:

```
DemoChain: gettotalbalances 0
{"method": "gettotalbalances", "params": [0], "id": "22196304-1541689352", "chain_name": "DemoChain"}

[
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 1900.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 89000.00000000
 },
 {
 "name" : "asset1",
```

```

 "assetref" : "167-266-39973",
 "qty" : 775.00000000
},
{
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 10500.00000000
}
]

```

## MultiChain Demo – DemoChain Nodo 1

Node   Permissions   Issue Asset | Update   Send   Create Offer | Accept   Create Stream   Publish   View Streams

### Available Balances

<b>Label</b>	AdminMaster
<b>Address</b>	IWLH5fhAqmJDAAnSmdP2o5wbxK7h3Uouf39qHt
<b>USD</b>	1900
<b>asset1</b>	775
<b>JPY</b>	10500

<b>Label</b>	NewAddress01
<b>Address</b>	18vsVGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	39500
<b>USD</b>	100
<b>GBP</b>	1000

En nodo 2:

```

DemoChain: gettotalbalances 0
{"method":"gettotalbalances","params":[0],"id":"96819379-1541689325","chain_name":"DemoChain"}

```

```

[
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 225.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 39500.00000000
 },
]

```

```
{
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 100.00000000
},
{
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
}
]
```

## MultiChain Demo – DemoChain Nodo 2

[Node](#)   [Permissions](#)   [Issue Asset | Update](#)   [Send](#)   [Create Offer | Accept](#)   [Create Stream](#)   [Publish](#)   [View Streams](#)

### Available Balances

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	39500
<b>USD</b>	100
<b>GBP</b>	1000

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
<b>USD</b>	1900
<b>asset1</b>	775
<b>JPY</b>	10500

### Decode Offer

Offer hexadecimal:

[Decode Offer](#)

The first server should have 100 dollars and 10500 yen. The second server should have 100 dollars and 39500 yen.

The exchange of assets was performed atomically in a single transaction, which you can view on both servers using: [listwallettransactions 1](#)

```
DemoChain: help listwallettransactions
{"method":"help","params":["listwallettransactions"],"id":"87704404-1541693497","chain_name":"DemoChain"}
```

```
listwallettransactions (count skip includeWatchonly verbose)
```

Lists information about the <count> most recent transactions [in](#) this node's wallet.

Arguments:

```

1. count (numeric, optional, default=10) The
number of transactions to return
2. skip (numeric, optional, default=0) The
number of transactions to skip
3. includeWatchonly (bool, optional, default=false) Include
transactions to watchonly addresses (see 'importaddress')
4. verbose (bool, optional, default=false) If
true, returns detailed array of inputs and outputs and raw hex of
transactions

```

Result:

```
[
{
 "balance": {...}, (object) Changes in wallet balance.
 {
 "amount": x.xxx, (numeric) The amount in native
currency. Negative value means amount was send by the wallet, positive -
received
 "assets": {...}, (object) Changes in asset amounts.
 }
 "myaddresses": [...], (array) Array of wallet addresses
involved in transaction
 "addresses": [...], (array) Array of counterparty
addresses involved in transaction
 "permissions": [...], (array) Changes in permissions
 "issue": {...}, (object) Issue details
 "data" : "metadata", (array) Hexadecimal representation of
metadata appended to the transaction
 "confirmations": n, (numeric) The number of confirmations
for the transaction. Available for 'send' and
 'receive' category of
transactions.
 "blockhash": "hashvalue", (string) The block hash containing
the transaction. Available for 'send' and 'receive'
 category of transactions.
 "blockindex": n, (numeric) The block index containing
the transaction. Available for 'send' and 'receive'
 category of transactions.
 "txid": "transactionid", (string) The transaction id. Available
for 'send' and 'receive' category of transactions.
 "time": xxx, (numeric) The transaction time in
seconds since epoch (midnight Jan 1 1970 GMT).
 "timereceived": xxx, (numeric) The time received in seconds
since epoch (midnight Jan 1 1970 GMT). Available
 for 'send' and 'receive'
category of transactions.
 "comment": "...", (string) If a comment is associated
with the transaction.
 "vin": [...], (array) If verbose=true. Array of
input details
 "vout": [...], (array) If verbose=true. Array of
output details
 "hex" : "data" (string) If verbose=true. Raw data for
transaction
}
```

]

Examples:

List the most recent 10 transactions [in](#) the systems  
> multichain-cli DemoChain listwallettransactions

List transactions 100 to 120  
> multichain-cli DemoChain listwallettransactions 20 100

As a json rpc call

```
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id":"curltest", "method": "listwallettransactions", "params": [20, 100] }' -H 'content-type: text/plain;' http://127.0.0.1:7440
```

En Nodo 1:

```
DemoChain: listwallettransactions 1
{"method": "listwallettransactions", "params": [1], "id": "87431422-1541693590", "chain_name": "DemoChain"}
```

```
[
 {
 "balance" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : -100.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 10500.00000000
 }
]
 },
 "myaddresses" : [
 "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHT"
],
 "addresses" : [
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
],
 "permissions" : [
],
 "items" : [
],
 "data" : [
],
],
```

```

 "confirmations" : 11,
 "blockhash" :
"00aff63166264946c5fecc12613d9e4a7b475cbc03ed90626acea49b74a6f447",
 "blockindex" : 1,
 "blocktime" : 1541688956,
 "txid" :
"dd2b39ed59532c27cdad72d7d349cc36501dcc09eb079c272378091c2dd3450",
 "valid" : true,
 "time" : 1541688936,
 "timereceived" : 1541688936
}
]

```

En nodo 2:

```

DemoChain: listwallettransactions 1
{"method":"listwallettransactions","params":[1],"id":"17845122-1541693829","chain_name":"DemoChain"}

[
{
 "balance" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : -10500.00000000
 },
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 100.00000000
 }
]
 },
 "myaddresses" : [
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
],
 "addresses" : [
 "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
],
 "permissions" : [
],
 "items" : [
],
 "data" : [
],
 "confirmations" : 11,
 "blockhash" :
"00aff63166264946c5fecc12613d9e4a7b475cbc03ed90626acea49b74a6f447",

```

```

 "blockindex" : 1,
 "blocktime" : 1541688956,
 "txid" :
"dd2b39ed59532c27cdad72d7d349cc36501dcca09eb079c272378091c2dd3450",
 "valid" : true,
 "time" : 1541688936,
 "timereceived" : 1541688936
 }
]

```

## Three-way exchange with metadata

Now we'll perform a more complex exchange between three different addresses, two belonging to the first node and one to the second.

We will also add some metadata to the exchange transaction. Let's begin by creating a new address on the first server (Nodo 1):

```

DemoChain: getnewaddress
{"method":"getnewaddress", "params":[], "id":"76207908-
1541855804", "chain_name":"DemoChain"}

1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE

```

Let's grant this address the necessary permissions, still on the first server:

```

DemoChain: grant 1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE send, receive
{"method":"grant", "params":
[["1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE", "send, receive"], "id":"83310617-
1541855879", "chain_name":"DemoChain"}
```

```
f8e493925c9b56e33824f9e99ab8f68950f3e98367dc39f648d041316a3109b0
```

Veamos quien dispone de USD en este nodo:

```

DemoChain: getmultibalances "*" USD 0 false true
{"method":"getmultibalances", "params":
["*", "USD", 0, false, true], "id":"60203551-
1541855996", "chain_name":"DemoChain"}
```

```
{
 "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 1900.00000000
 }
],

```

```

"total" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 1900.00000000
 }
]
}

```

And now let's send it some of the dollars owned by this node's other address:

```

DemoChain: help sendassetfrom
{"method":"help","params":["sendassetfrom"],"id":"55540602-1541858442","chain_name":"DemoChain"}

sendassetfrom "from-address" "to-address" "asset-identifier" asset-qty (
native-amount "comment" "comment-to")

```

Send an asset amount using specific address.

Arguments:

1. "from-address" (string, required) Address to send from.
2. "to-address" (string, required) The address to send to.
3. "asset-identifier" (string, required) Asset identifier - one of the following: issue txid, asset reference, asset name.
4. asset-qty (numeric, required) Asset quantity to send. eg 0.1
5. native-amount (numeric, optional) native currency amount to send. eg 0.1, Default: minimum-per-output.
6. "comment" (string, optional) A comment used to store what the transaction is for.  
This is not part of the transaction, just kept in your wallet.
7. "comment-to" (string, optional) A comment to store the name of the person or organization to which you're sending the transaction. This is not part of the transaction, just kept in your wallet.

Result:

"transactionid" (string) The transaction id.

Examples:

```

> multichain-cli DemoChain sendassetfrom
"1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd" "1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd"
0.1 12345-6789-1234 100
> multichain-cli DemoChain sendassetfrom
"1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd" "1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd"
0.1 12345-6789-1234 100 "donation" "seans outpost"
> curl --user myusername --data-binary '{"jsonrpc": "1.0", "id":"curltest",
"method": "sendassetfrom", "params": ["1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd",
"1M72Sfpbz1BPpXFHz9m3CdqATR44Jvaydd", 0.1, 12345-6789-1234, 100,
"donation", "seans outpost"] }' -H 'content-type: text/plain;'
```

<http://127.0.0.1:7440>

```
DemoChain: sendassetfrom 1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt
1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE USD 300 0 "donation" "demo outpost"
{"method":"sendassetfrom", "params":
["1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt", "1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhN
VbkMfE", "USD", 300, 0, "donation", "demo outpost"], "id": "17192034-
1541858856", "chain_name": "DemoChain"}
```

2516be7c8fbb649118899eaa6ae26e82e7d120d403b003d1b56c596c25c52d31

## MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	381	413	4	4	2	1	2018-10-28	12.9

### Latest Transactions

Txid	Type	Confirmation	Time
2516be7c8fbb649118899eaa6ae26e82e7d120d403b003d1b56c596c25c52d31	Asset	11 confirmations	< 1 hours

## Transaction 2516be7c8f...2d31

Hash	2516be7c8fbb649118899eaa6ae26e82e7d120d403b003d1b56c596c25c52d31
Appeared in	MultiChain DemoChain, Block 371 (2018-11-10 15:07:57)
Number of inputs	1 – jump to inputs
Number of outputs	2 – jump to outputs
Size	285 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

### Inputs

Index	Previous output	Native	From address	ScriptSig
0	111ccccac66...:1	0	1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt	71:3044...7301 33:0339...43c8

### Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE	DUP HASH160 20:ddc3...3d36 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  300.00 units of asset <a href="#">USD</a>
1	Not yet redeemed	0	1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  1600.00 units of asset <a href="#">USD</a>

## MultiChain DemoChain

### Asset Summary "USD"

Issue Block Height	294
Issue Block Time	1541666091 (2018-11-08 09:34:51)
Issue TXID	c01ab8282b32adc7133375501fe099d02c589326ebfed45aadba8531a9ff58c
Asset Reference	294-266-6848
Name	USD
Addresses holding units	<a href="#">3 – jump to holders</a>
Asset Issues	<a href="#">1 – jump to issues</a>
Raw units issued	200000
Display quantity	2000.00
Native amount sent	0
Issuer Address	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
Issue Recipient Address	1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt

[MultiChain JSON](#)

### Asset Issues

Txid	Issue Amount	Details
<a href="#">c01ab828...</a>	2000.00	

### Asset Holders

Address	Balance
<a href="#">1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt</a>	1600.00 (transactions)
<a href="#">1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg</a>	100.00 (transactions)
<a href="#">1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE</a>	300.00 (transactions)

### Transactions

Transaction	Block
<a href="#">c01ab8282b32adc7133375501fe099d02c589326ebfed45aadba8531a9ff58c</a>	294
<a href="#">111cccac66043db048d0f7e488a9f275811d7c40430844dd2eb01f9821688f19</a>	338
<a href="#">dd2b39ed59532c27cdad72d7d349cc36501dccaa09eb079c272378091c2dd3450</a>	349
<a href="#">2516be7c8fb649118899eaa6ae26e82e7d120d403b003d1b56c596c25c52d31</a>	371

## Address 1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE

### Permissions

- Send
- Receive

### Asset Balances

Asset Name	Asset Reference	Transactions	Raw Units	Balance
<a href="#">USD</a>	<a href="#">294-266-6848</a>	<a href="#">1</a>	30000	300.00

A transaction ID should be displayed, and the balance for all addresses can be seen:

```
DemoChain: getmultibalances
{"method":"getmultibalances","params":[],"id":"11774960-1541863492","chain_name":"DemoChain"}}

{
```

```

"1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 300.00000000
 }
],
"1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 1600.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 10500.00000000
 },
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 775.00000000
 }
],
"15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 40000.00000000
 }
],
"18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 49000.00000000
 }
],
"total" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 1900.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 89000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 10500.00000000
 }
]
}

```

```

 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 775.00000000
 }
]
}

```

## Available Balances

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
<b>USD</b>	1600
<b>JPY</b>	10500
<b>asset1</b>	775

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	39500
<b>USD</b>	100
<b>GBP</b>	1000

<b>Address</b>	1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE
<b>USD</b>	300

Now let's create a new exchange transaction, similar to the first one. On the second server (Nodo 2):

```

DemoChain: preparelockunspentfrom 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
'{"JPY":10500}'

{"method":"preparelockunspentfrom","params":
["1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg", {"JPY":10500}], "id":"28103207-1541865282", "chain_name":"DemoChain"}

{
 "txid" :
"2fbbad25eacc13d9123109d5de0a4764d0c852dcfd26e721ff489c9e1054b453",
 "vout" : 0
}

```

}

# MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 Search

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	388	421	4	4	2	1	2018-10-28	12.9

## Latest Transactions

Txid	Type	Confirmation	Time
<a href="#">2fbbad25eacc13d9123109d5de0a4764d0c852dcfd26e721ff489c9e1054b453</a>	Asset	11 confirmations	< 1 minutes

## Transaction 2fbbad25ea...b453

Hash	2fbbad25eacc13d9123109d5de0a4764d0c852dcfd26e721ff489c9e1054b453
Appeared in	MultiChain DemoChain, Block 382 (2018-11-10 16:54:56)
Number of inputs	<a href="#">1 – jump to inputs</a>
Number of outputs	<a href="#">2 – jump to outputs</a>
Size	285 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

### Inputs

Index	Previous output	Native	From address	ScriptSig
0	<a href="#">6f57087c00...:1</a>	0	<a href="#">1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg</a>	71:3044...8501 33:02f2...73dd

### Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	<a href="#">1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg</a>	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  10500 units of asset <a href="#">JPY</a>
1	Not yet redeemed	0	<a href="#">1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg</a>	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  29000 units of asset <a href="#">JPY</a>

## MultiChain Demo – DemoChain Nodo 2

[Node](#)   [Permissions](#)   [Issue Asset | Update](#)   [Send](#)   [Create Offer | Accept](#)   [Create Stream](#)   [Publish](#)   [View Streams](#)

### Available Balances

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	29000 (10500 locked)
<b>USD</b>	100
<b>GBP</b>	1000

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
<b>USD</b>	1600
<b>JPY</b>	10500
<b>asset1</b>	775

As before, we start building the exchange transaction, specifying that we want 100 dollars in exchange for these 10500 yen ( seguimos en Nodo 2):

```
DemoChain: createrawexchange
2fbbad25eacc13d9123109d5de0a4764d0c852dcfd26e721ff489c9e1054b453 0
'{"USD":100}'
{"method":"createrawexchange","params":
["2fbbad25eacc13d9123109d5de0a4764d0c852dcfd26e721ff489c9e1054b453",0,
 {"USD":100}],"id":"52848131-1541865843","chain_name":"DemoChain"}
```

```
010000000153b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2f0
00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a0d
4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c49
d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
fffffff010000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488a
c1c73706b71d099e01f50753313c7ad322b28b81ac010270000000000007500000000
```

Copy the hexadecimal blob shown on the second server to some temporary place, then switch to the first server:

```
DemoChain: preparelockunspentfrom 1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
'{"USD":60}'
{"method":"preparelockunspentfrom","params":
["1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt", {"USD":60}],"id":"87015067-1541866286","chain_name":"DemoChain"}
```

```
{
 "txid" :
"8cc44b963e9971a21e07c22d41efd8a0ef71f54cfccf4957d15bab8f1fa522f2",
 "vout" : 0
}
```

## MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	392	425	4	4	2	1	2018-10-28	12.9

### Latest Transactions

Txid	Type	Confirmation	Time
8cc44b963e9971a21e07c22d41efd8a0ef71f54cfccf4957d15bab8f1fa522f2	Asset	5 confirmations	< 1 minute

## Transaction 8cc44b963e...22f2

Hash	8cc44b963e9971a21e07c22d41efd8a0ef71f54cfccf4957d15bab8f1fa522f2
Appeared in	MultiChain DemoChain, Block 393 (2018-11-10 17:11:47)
Number of inputs	<a href="#">1 – jump to inputs</a>
Number of outputs	<a href="#">2 – jump to outputs</a>
Size	285 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

### Inputs

Index	Previous output	Native	From address	ScriptSig
0	<a href="#">2516be7c8f...:1</a>	0	<a href="#">1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt</a>	71:3044...9401 33:0339...43c8

### Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	<a href="#">1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt</a>	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  60.00 units of asset <a href="#">USD</a>
1	Not yet redeemed	0	<a href="#">1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt</a>	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  1540.00 units of asset <a href="#">USD</a>

And now we'll add this offer of 60 dollars to the exchange transaction, request 6300 yen in exchange (pro rata as per the original offer):

```
DemoChain: appendrawexchange
010000000153b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2f0
00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a0d
4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c49
d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
fffff0100000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488a
c1c73706b71d099e01f50753313c7ad322b28b81ac0102700000000000750000000
8cc44b963e9971a21e07c22d41efd8a0ef71f54cfccf4957d15bab8f1fa522f2 0
```

2018-11-11

```
{"JPY":6300}
{"method":"appendrawexchange", "params":
["010000000153b454109e9c48ff21e726fddc52c8d064470aded5093112d913cceaa25adbb2
f000000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a
0d4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c
49d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dd
fffffffff010000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d048
8ac1c73706b71d099e01f50753313c7ad322b28b81ac010270000000000007500000000", "8
cc44b963e9971a21e07c22d41efd8a0ef71f54cff4957d15bab8f1fa522f2", 0,
{"JPY":6300}], "id":"77476553-1541866749", "chain_name": "DemoChain"}}

{
 "hex" :
"010000000253b454109e9c48ff21e726fddc52c8d064470aded5093112d913cceaa25adbb2f
000000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a0
d4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c4
9d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddf
fffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c0000
00006a47304402206dccb4dd2dd00be50ec843e0974664bfb3aed2c998df1e8dc1d55fc4c84
dbb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa383
21033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffff
f020000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c73
706b71d099e01f50753313c7ad322b28b81ac01027000000000000750000000000000000000377
6a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d0
39e1bd06957ff9709c180000000000007500000000",
 "complete" : false
}
```

The output should contain a longer hexadecimal blob, alongside complete : false, meaning that the exchange is not yet balanced. Copy this longer blob to the clipboard, and let's try sending it:

```
DemoChain: sendrawtransaction
010000000253b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2f0
000000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a0d
4cfbda2b250220265ea7c8d58b42af49f404ffbfb373125089d127a3a78e0533b913adc11c49
d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
fffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c00000
0006a47304402206dccd4dd2dd00be50ec843e0974664bfb3aed2c998df1e8dc1d55fc4c84d
bb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa3832
1033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
0200000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c737
06b71d099e01f50753313c7ad322b28b81ac01027000000000000750000000000000000000003776
a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d03
9e1bd06957ff9709c1800000000000007500000000
{"method": "sendrawtransaction", "params":
["010000000253b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2
f000000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a
0d4cfbda2b250220265ea7c8d58b42af49f404ffbfb373125089d127a3a78e0533b913adc11c
49d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dd
fffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c000
000006a47304402206dccd4dd2dd00be50ec843e0974664bfb3aed2c998df1e8dc1d55fc4c8
4dbb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa38
```

```
error code: -26
error message:
64: Asset transfer script rejected - mismatch in input/output quantities
```

An error should be displayed regarding a mismatch between the transaction's input and output quantities. So let's see which assets are still being offered and requested in this larger transaction:

```
DemoChain: decoderawexchange
010000000253b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2f0
00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a0d
4cfbda2b250220265ea7c8d58b42af49f404ffb373125089d127a3a78e0533b913adc11c49
d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dff
ffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c00000
0006a47304402206dccd4dd2dd00be50ec843e0974664bfb3aed2c998df1e8dc1d55fc4c84d
bb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa3832
1033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
020000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c737
06b71d099e01f50753313c7ad322b28b81ac01027000000000000750000000000000000003776
a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d03
9e1bd06957ff9709c18000000000000750000000
{"method": "decoderawexchange", "params": [
 "010000000253b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2
 f00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a
 0d4cfbda2b250220265ea7c8d58b42af49f404ffb373125089d127a3a78e0533b913adc11c
 49d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dd
 ffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c000
 000006a47304402206dccd4dd2dd00be50ec843e0974664bfb3aed2c998df1e8dc1d55fc4c8
 4dbb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa38
 321033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
 ff020000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c7
 3706b71d099e01f50753313c7ad322b28b81ac0102700000000000075000000000000000000037
 76a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d
 039e1bd06957ff9709c1800000000000750000000"
], "id": "94060315-1541867093", "chain_name": "DemoChain"}
```

```
{
 "offer" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 4200.00000000
 }
]
 }
}
```

```

},
"ask" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 40.00000000
 }
]
},
"requiredfee" : 0.00000000,
"candisable" : true,
"cancomplete" : true,
"complete" : false
}

```

This should show that there are still a further 4200 yen on offer, and a further 40 dollars being requested.  
For a more detailed breakdown:

```

DemoChain: decoderawexchange
01000000253b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2f0
00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a0d
4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c49
d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
ffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c00000
0006a47304402206dccd4dd2dd00be50ec843e0974664fb3aed2c998df1e8dc1d55fc4c84d
bb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa3832
1033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
020000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c737
06b71d099e01f50753313c7ad322b28b81ac0102700000000000075000000000000000000003776
a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d03
9e1bd06957ff9709c180000000000007500000000 true
{"method":"decoderawexchange","params":
["01000000253b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2
f00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a
0d4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c
49d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dd
ffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c0000
00006a47304402206dccd4dd2dd00be50ec843e0974664fb3aed2c998df1e8dc1d55fc4c8
4dbb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa38
321033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
ff020000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c7
3706b71d099e01f50753313c7ad322b28b81ac01027000000000000750000000000000000000037
76a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d
039e1bd06957ff9709c180000000000007500000000",true],"id":"90198242-
1541867216","chain_name":"DemoChain"}}

{
 "offer" : {
 "amount" : 0.00000000,
 "assets" : [
 {

```

```

 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 4200.00000000
 }
]
},
"ask" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 40.00000000
 }
],
 "requiredfee" : 0.00000000,
 "candisable" : true,
 "cancomplete" : true,
 "complete" : false,
 "exchanges" : [
 {
 "offer" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 10500.00000000
 }
],
 "address" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
 "txid" :
 "2fbbad25eacc13d9123109d5de0a4764d0c852dcfd26e721ff489c9e1054b453",
 "vout" : 0
 },
 "ask" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 100.00000000
 }
],
 "address" : "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
 }
 }
],
 "offer" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",

```

```

177/193
 "qty" : 60.00000000
}
],
"address" : "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt",
"txid" :
"8cc44b963e9971a21e07c22d41efd8a0ef71f54cfccf4957d15bab8f1fa522f2",
"vout" : 0
},
"ask" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 6300.00000000
 }
],
 "address" : "1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt"
}
}
]
}

```

The `exchanges` field shows all of the individual `offer` and `ask` stages in the exchange transaction so far, alongside the `address` involved. Now let's complete the exchange using this node's other address:

```

DemoChain: preparelockunspentfrom 1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE
'{"USD":40}'
{"method":"preparelockunspentfrom", "params":
["1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE", {"USD":40}], "id":"99623155-1541867320", "chain_name":"DemoChain"}

{
 "txid" :
"269aea6b98f900dbcfefdad4b188852724a145eac220784566ddf7a5ba48587e",
 "vout" : 0
}

```

## MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

 

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	405	440	4	4	2	1	2018-10-28	13.0

### Latest Transactions

Txid	Type	Confirmation	Time
269aea6b98f900dbcfefdad4b188852724a145eac220784566ddf7a5ba48587e	Asset	3 confirmations	< 1 minute

 Transaction 269aea6b98...587e

Hash	269aea6b98f900dbcfefdad4b188852724a145eac220784566ddf7a5ba48587e
Appeared in	MultiChain DemoChain, Block 404 (2018-11-10 17:29:03)
Number of inputs	1 – jump to inputs
Number of outputs	2 – jump to outputs
Size	285 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

## Inputs

Index	Previous output	Native	From address	ScriptSig
0	2516be7c8f...:0	0	1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE	71:3044...4801 33:02c1...11e1

## Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE	DUP HASH160 20:ddc3...3d36 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  40.00 units of asset USD
1	Not yet redeemed	0	1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE	DUP HASH160 20:ddc3...3d36 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  260.00 units of asset USD

We use a different API here, to ensure that no further stages can be added, and to include some metadata (signed by the last party only):

```
DemoChain: completerawexchange
010000000253b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2f0
00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a0d
4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c49
d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
ffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c00000
0006a47304402206dccd4dd2dd00be50ec843e0974664fbfb3aed2c998df1e8dc1d55fc4c84d
bb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa3832
1033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
0200000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c737
06b71d099e01f50753313c7ad322b28b81ac01027000000000007500000000000000000003776
a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d03
9e1bd06957ff9709c180000000000007500000000
269aea6b98f900dbcfefdad4b188852724a145eac220784566ddf7a5ba48587e 0
'{"JPY":4200}' "476f65732074687265652077617973"
>{"method": "completerawexchange", "params":
["010000000253b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2
f00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a
0d4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c
49d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dd
ffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c0000
000006a47304402206dccd4dd2dd00be50ec843e0974664fbfb3aed2c998df1e8dc1d55fc4c8
4dbb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa38
321033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
ff02000000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c7
3706b71d099e01f50753313c7ad322b28b81ac01027000000000007500000000000000000037
76a914d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d
039e1bd06957ff9709c180000000000007500000000", "269aea6b98f900dbcfefdad4b1888
```

```
52724a145eac220784566ddf7a5ba48587e", 0,
{"JPY":4200}, "476f65732074687265652077617973"], "id": "19293443-
1541868043", "chain_name": "DemoChain"}
```

```
010000000353b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2f0
00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a0d
4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c49
d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
ffffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c00000
0006a47304402206dccd4dd2dd00be50ec843e0974664fb3aed2c998df1e8dc1d55fc4c84d
bb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa3832
1033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
7e5848baa5f7dd66457820c2ea45a124278588b1d4daefcfdb00f9986bea9a26000000006a4
7304402203396b43ae67aad660e6ab4380e54ae4fe87a569af7f780d59a5b5bd7d04e594b02
203e91f4dfc24a8b8277bbd3e116c59f26c47192314ead7d4ac992da56a18fd838012102c1d
13970937268160ce0d88989e04f0776b36e142858b23e2f5c56505e2411e1fffffff040000
0000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c73706b71d
099e01f50753313c7ad322b28b81ac01027000000000000750000000000000000003776a914d9
072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d039e1bd0
6957ff9709c180000000000000750000000000000003776a914ddc3c15a91124060fe3f292d
5a7d65af17c53d3688ac1c73706b71698a0ebe2c7bc1d039e1bd06957ff9706810000000000
0007500000000000000000116a0f476f65732074687265652077617973000000000
```

This should output the longest hexadecimal blob yet, which we can finally broadcast for confirmation:

```
DemoChain: sendrawtransaction
010000000353b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2f0
00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a0d
4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c49
d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773ddff
ffffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c00000
0006a47304402206dccd4dd2dd00be50ec843e0974664fb3aed2c998df1e8dc1d55fc4c84d
bb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa3832
1033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
7e5848baa5f7dd66457820c2ea45a124278588b1d4daefcfdb00f9986bea9a26000000006a4
7304402203396b43ae67aad660e6ab4380e54ae4fe87a569af7f780d59a5b5bd7d04e594b02
203e91f4dfc24a8b8277bbd3e116c59f26c47192314ead7d4ac992da56a18fd838012102c1d
13970937268160ce0d88989e04f0776b36e142858b23e2f5c56505e2411e1fffffff040000
0000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c73706b71d
099e01f50753313c7ad322b28b81ac01027000000000000750000000000000000003776a914d9
072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d039e1bd0
6957ff9709c1800000000000007500000000000000003776a914ddc3c15a91124060fe3f292d
5a7d65af17c53d3688ac1c73706b71698a0ebe2c7bc1d039e1bd06957ff9706810000000000
0007500000000000000000116a0f476f65732074687265652077617973000000000
{"method": "sendrawtransaction", "params":
["010000000353b454109e9c48ff21e726fddc52c8d064470aded5093112d913cce25adbb2
f00000006b483045022100e0f0d51a40fbce1eaba99057573d4b0c48c810d5d7eadbe40f6a
0d4cfbda2b250220265ea7c8d58b42af49f404ffbf373125089d127a3a78e0533b913adc11c
49d88832102f2ebc41915660d6f45dbbf96587f351ed9f46a58e8f71718816994248a0773dd
ffffffffff222a51f8fab5bd15749cffc4cf571efa0d8ef412dc2071ea271993e964bc48c000
000006a47304402206dccd4dd2dd00be50ec843e0974664fb3aed2c998df1e8dc1d55fc4c8
4dbb9c02206077017ba2e92ad78c90a61ac1cc3ba13b887de685ec16a709946d0436f4cfa38
```

```
321033988a800c3c3b99e06fea653a27c1638027d1482dd0db70c8992f1c6369f43c8fffffff
ff7e5848baa5f7dd66457820c2ea45a124278588b1d4daefcfdb00f9986bea9a260000000006
a47304402203396b43ae67aad660e6ab4380e54ae4fe87a569af7f780d59a5b5bd7d04e594b
02203e91f4dfc24a8b8277bbd3e116c59f26c47192314ead7d4ac992da56a18fd838012102c
1d13970937268160ce0d88989e04f0776b36e142858b23e2f5c56505e2411e1fffffffff0400
0000000000000003776a914ad9011a02cc6b7ad4a2eb01c46e297f4dc854d0488ac1c73706b7
1d099e01f50753313c7ad322b28b81ac0102700000000000750000000000000003776a914
d9072b1912e87ed2ce281356ea00728825a5229188ac1c73706b71698a0ebe2c7bc1d039e1b
d06957ff9709c18000000000000750000000000000003776a914ddc3c15a91124060fe3f29
2d5a7d65af17c53d3688ac1c73706b71698a0ebe2c7bc1d039e1bd06957ff97068100000000
000007500000000000000116a0f476f6573207468726565207761797300000000"] , "id":
"25210853-1541868167" , "chain_name": "DemoChain" }
```

f560b758390a671038b5ad341fcc6efed0adae0be87b00b758252357ba97e0cf

 MultiChain Explorer

Search by address, block number or hash, transaction or chain name:

Search

Address or hash search requires at least the first 6 characters.

Status	Chain	Blocks	Transactions	Assets	Addresses	Streams	Peers	Started	Age (days)
Connected	MultiChain DemoChain	418	454	4	4	2	1	2018-10-28	13.0

## Latest Transactions

Txid	Type	Confirmation	Time
f560b758390a671038b5ad341fc6efed0adae0be87b00b758252357ba97e0cf	Asset Metadata	5 confirmations	< 1 minute

 Transaction f560b75839...e0cf

Hash	f560b758390a671038b5ad341fcc6efed0adae0be87b00b758252357ba97e0cf
Appeared in	<a href="#">MultiChain DemoChain, Block 415</a> (2018-11-10 17:43:00)
Number of inputs	<a href="#">3 – jump to inputs</a>
Number of outputs	<a href="#">4 – jump to outputs</a>
Size	670 bytes

[Bitcoin JSON](#) [MultiChain JSON](#) [MultiChain Hex](#)

## Inputs

Index	Previous output	Native	From address	ScriptSig
0	2fbbad25ea...:0	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	72:3045...8883 33:02f2...73dd
1	8cc44b963e...:0	0	1WLH5fhAqmJDAnSmP2o5VwbxK7h3Uouf39qHt	71:3044...a383 33:0339...43c8
2	269aea6b98...:0	0	1WyQf5vqy3hGqrzKApEuDnyi9ZgvhNVbkMfE	71:3044...3801 33:02c1...11e1

## Outputs

Index	Redeemed at input	Native	To address	ScriptPubKey
0	Not yet redeemed	0	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg	DUP HASH160 20:ad90...4d04 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  100.00 units of asset USD
1	Not yet redeemed	0	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt	DUP HASH160 20:d907...2291 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  6300 units of asset JPY
2	Not yet redeemed	0	1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE	DUP HASH160 20:ddc3...3d36 EQUALVERIFY CHECKSIG 28:7370...0000 DROP  4200 units of asset JPY
3	Not yet redeemed	0	None	RETURN 15:476f...7973  Metadata 476f65732074687265652077617973

## Hex to ASCII text converter

Enter 2 digits hex numbers with any prefix / postfix / delimiter and press the *Convert* button (e.g. 45 78 61 6d 70 6C 65 21):

Convert
 Reset
 Swap

Goes three ways

Now let's see how this transaction looks to both nodes. First, from the global perspective on both servers:

Nodo 1:

```
DemoChain: listwallettransactions 1
{"method": "listwallettransactions", "params": [1], "id": "34237478-
```

```
1541868525", "chain_name": "DemoChain"}
```

```
[
 {
 "balance" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : -100.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 10500.00000000
 }
]
 },
 "myaddresses" : [
 "1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE",
 "1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt"
],
 "addresses" : [
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
],
 "permissions" : [
],
 "items" : [
],
 "data" : [
 "476f65732074687265652077617973"
],
 "confirmations" : 11,
 "blockhash" :
 "001e711735397079146a7f2ca5c34e76656ca241d8c0533c63dde832ebb3c05d",
 "blockindex" : 1,
 "blocktime" : 1541868180,
 "txid" :
 "f560b758390a671038b5ad341fcc6efed0adae0be87b00b758252357ba97e0cf",
 "valid" : true,
 "time" : 1541868167,
 "timereceived" : 1541868167
 }
]
```

Nodo 2:

```
DemoChain: listwallettransactions 1
{"method": "listwallettransactions", "params": [1], "id": "39060869-1541868596", "chain_name": "DemoChain"}
```

```
[
 {
 "balance" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : -10500.00000000
 },
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 100.00000000
 }
]
 },
 "myaddresses" : [
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
],
 "addresses" : [
 "1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMFE",
 "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
],
 "permissions" : [
],
 "items" : [
],
 "data" : [
 "476f65732074687265652077617973"
],
 "confirmations" : 11,
 "blockhash" :
 "001e711735397079146a7f2ca5c34e76656ca241d8c0533c63dde832ebb3c05d",
 "blockindex" : 1,
 "blocktime" : 1541868180,
 "txid" :
 "f560b758390a671038b5ad341fcc6efed0adae0be87b00b758252357ba97e0cf",
 "valid" : true,
 "time" : 1541868167,
 "timereceived" : 1541868167
 }
]
```

Note how the metadata is shown in the data field. Then on the first server, let's see how it looks from the perspective of each address:

```
DemoChain: listaddressestransactions 1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt 1
{ "method": "listaddressestransactions", "params":
 ["1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt", 1], "id": "37152936-
 1541868683", "chain_name": "DemoChain" }
```

```
[{"balance": {"amount": "0.00000000", "assets": [{"name": "USD", "assetref": "294-266-6848", "qty": "-60.00000000"}, {"name": "JPY", "assetref": "316-266-63856", "qty": "6300.00000000"}]}, {"myaddresses": ["1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"]}, {"addresses": ["1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg", "1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE"]}, {"permissions": []}, {"items": []}, {"data": ["476f65732074687265652077617973"]}, {"confirmations": 11, "blockhash": "001e711735397079146a7f2ca5c34e76656ca241d8c0533c63dde832ebb3c05d", "blockindex": 1, "blocktime": 1541868180, "txid": "f560b758390a671038b5ad341fcc6efed0adae0be87b00b758252357ba97e0cf", "valid": true, "time": 1541868167, "timereceived": 1541868167}], {"method": "listaddresstransactions", "params": [{"id": "96054835-1541868702", "chain_name": "DemoChain"}]}]
```

```
{"balance": {"amount": "0.00000000", "assets": [{"name": "USD",
```

```

 "assetref" : "294-266-6848",
 "qty" : -40.00000000
},
{
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 4200.00000000
}
]
},
"myaddresses" : [
 "1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE"
],
"addresses" : [
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",
 "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
],
"permissions" : [
],
"items" : [
],
"data" : [
 "476f65732074687265652077617973"
],
"confirmations" : 11,
"blockhash" :
"001e711735397079146a7f2ca5c34e76656ca241d8c0533c63dde832ebb3c05d",
"blockindex" : 1,
"blocktime" : 1541868180,
"txid" :
"f560b758390a671038b5ad341fcc6efed0adae0be87b00b758252357ba97e0cf",
"valid" : true,
"time" : 1541868167,
"timereceived" : 1541868167
}
]
]

```

On Second server (Nodo 2):

```

DemoChain: listaddresstransactions 1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg 1
{"method":"listaddresstransactions","params":
[{"1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg",1],"id":"67842267-1541928746","chain_name":"DemoChain"}

[
{
 "balance" : {
 "amount" : 0.00000000,
 "assets" : [
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",

```

```

 "qty" : -10500.00000000
 },
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 100.00000000
 }
]
},
"myaddresses" : [
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
],
"addresses" : [
 "1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE",
 "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
],
"permissions" : [
],
"items" : [
],
"data" : [
 "476f65732074687265652077617973"
],
"confirmations" : 11,
"blockhash" :
"001e711735397079146a7f2ca5c34e76656ca241d8c0533c63dde832ebb3c05d",
"blockindex" : 1,
"blocktime" : 1541868180,
"txid" :
"f560b758390a671038b5ad341fcc6efed0adae0be87b00b758252357ba97e0cf",
"valid" : true,
"time" : 1541868167,
"timereceived" : 1541868167
}
]

```

Notice how in each case, the balance, myaddresses and addresses fields change, to show the transaction from each perspective.

Vamos a ver los balances en ambos nodos:

Nodo 1:

```

DemoChain: getmultibalances
{"method":"getmultibalances","params":[],"id":"30335881-1541868761","chain_name":"DemoChain"}

{
 "1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 260.00000000

```

```

 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 4200.00000000
 }
],
 "15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 40000.00000000
 }
],
 "18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT" : [
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 49000.00000000
 }
],
 "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 1540.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 16800.00000000
 },
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 775.00000000
 }
],
 "total" : [
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 1800.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 89000.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 21000.00000000
 },
 {

```

```

 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 775.00000000
 }
]
}

```

Nodo 2:

```

DemoChain: getmultibalances
{"method":"getmultibalances","params":[],"id":"41882185-1541868838","chain_name":"DemoChain"}

{
 "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg" : [
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 225.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 29000.00000000
 },
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 200.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
 }
],
 "total" : [
 {
 "name" : "asset1",
 "assetref" : "167-266-39973",
 "qty" : 225.00000000
 },
 {
 "name" : "JPY",
 "assetref" : "316-266-63856",
 "qty" : 29000.00000000
 },
 {
 "name" : "USD",
 "assetref" : "294-266-6848",
 "qty" : 200.00000000
 },
 {
 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
 }
]
}

```

```

 "name" : "GBP",
 "assetref" : "217-267-25009",
 "qty" : 1000.00000000
 }
]
}

```

En Nodo 1: Partíamos de este estado de Balance

### Available Balances

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt
<b>USD</b>	1600
<b>JPY</b>	10500
<b>asset1</b>	775

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNyBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	39500
<b>USD</b>	100
<b>GBP</b>	1000

<b>Address</b>	1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE
<b>USD</b>	300

Nota: fijarse exclusivamente en las direcciones

"1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt" y

"1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE"

En Nodo 1: Ahora tenemos este estado de Balance

### Available Balances

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAAnSmdP2o5VwbxK7h3Uouf39qHt
<b>USD</b>	1540
<b>JPY</b>	16800
<b>asset1</b>	775

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	29000
<b>USD</b>	200
<b>GBP</b>	1000

<b>Address</b>	1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE
<b>USD</b>	260
<b>JPY</b>	4200

En Nodo 2: Partíamos de este estado de Balance

### Available Balances

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAoSmdP2o5VwbxK7h3Uouf39qHt
<b>USD</b>	1600
<b>JPY</b>	10500
<b>asset1</b>	775

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

<b>Address</b>	15fzSoXtzqCVLJ92fWT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	39500
<b>USD</b>	100
<b>GBP</b>	1000

<b>Address</b>	1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE
<b>USD</b>	300

Nota: fijarse exclusivamente en la dirección "**1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg**"

Nota: importamos la dirección **1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE** en Nodo 2:

```
DemoChain: importaddress 1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE "" true
{"method": "importaddress", "params":
["1WyQf5vqy3hGqrzzKAopEuDnyu9ZgvhNVbkMfE", "", true], "id": "74709410-1541928420", "chain_name": "DemoChain"}
```

En Nodo 2: Ahora tenemos este estado de Balance

### Available Balances

<b>Label</b>	AdminNode1
<b>Address</b>	1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg
<b>asset1</b>	225
<b>JPY</b>	29000
<b>USD</b>	200
<b>GBP</b>	1000

<b>Label</b>	NewAddress01
<b>Address</b>	18vsvGs4YD8NeMTdnPJA3azfoQewotnAvE7EBT
<b>GBP</b>	49000

<b>Address</b>	15fzSoXtzqCVLJ92fVVT6yx5XuKQqBuQvEP1s3
<b>GBP</b>	40000

<b>Label</b>	AdminMaster
<b>Address</b>	1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt
<b>USD</b>	1540
<b>JPY</b>	16800
<b>asset1</b>	775

<b>Address</b>	1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE
<b>USD</b>	260
<b>JPY</b>	4200

Resumen de la operación efectuada:

En Nodo 1:

- "1WLH5fhAqmJDAnSmdP2o5VwbxK7h3Uouf39qHt"
  - Tenía 1600 USD y 10500 JPY
  - Vende 60 USD
  - Recibe 6300 JPY a cambio
  - Ahora tiene 1540 USD y 16800 JPY
- "1WyQf5vqy3hGqrzZKAopEuDnyu9ZgvhNVbkMfE"
  - Tenía 300 USD y 0 JPY
  - Vende 40 USD
  - Recibe 4200 JPY a cambio
  - Ahora tiene 260 USD y 4200 JPY

En Nodo 2:

- "1QTZ9pGzuj4uTNYBkSYD3vjPvv1sTFwWw18gAg"
  - Tenía 100 USD y 39500 JPY
  - Recibe 100 USD
  - Vende 10500 JPY a cambio
  - Ahora tiene 200 USD y 29000 JPY