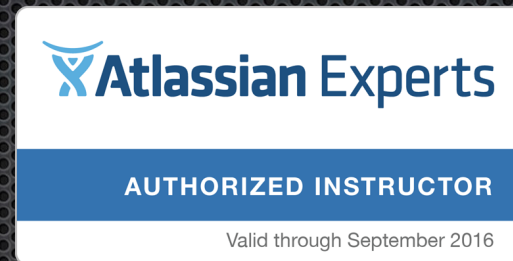
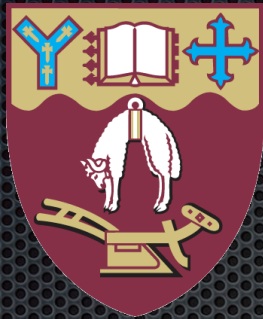


SECURING TRANSACTIONS ON THE BLOCKCHAIN

Agenda

- ✦ About me
- ✦ Understanding a block?
- ✦ Securing the blockchain LIVE DEMO

About Me



- ✦ Cloud Integration via API
- ✦ Founder of talkcrypto.org
- ✦ Involved in STEM based initiatives



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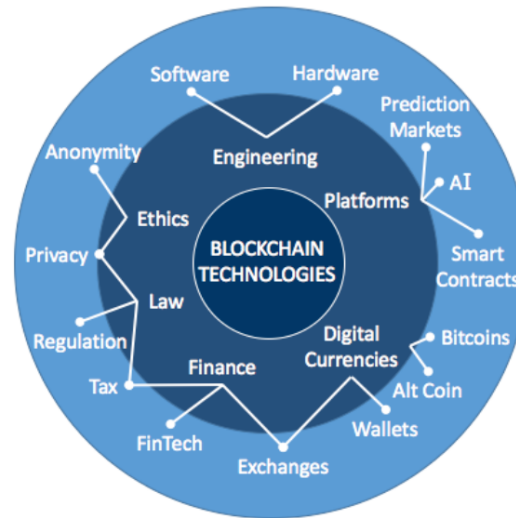
Sean Au

Sharing knowledge of digital currencies and blockchain technologies to students in Hutt Valley.

Never before in human history have we seen such a phenomenal amount of innovation as we do today. The invention of bitcoins revealed an underlying technology called the blockchain that has allowed innovation to flourish in a diverse range of industries.

Once limited to "computers geeks", this technology has spanned across new fields forcing governments to rethink policies and laws, academics to explore new areas of research and entrepreneurs to be more creative and innovative than ever.

Join us as we look to learn and share our knowledge with everyone around us.

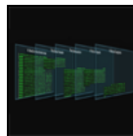


ARTICLES



What is a bitcoin address?

[View post](#)



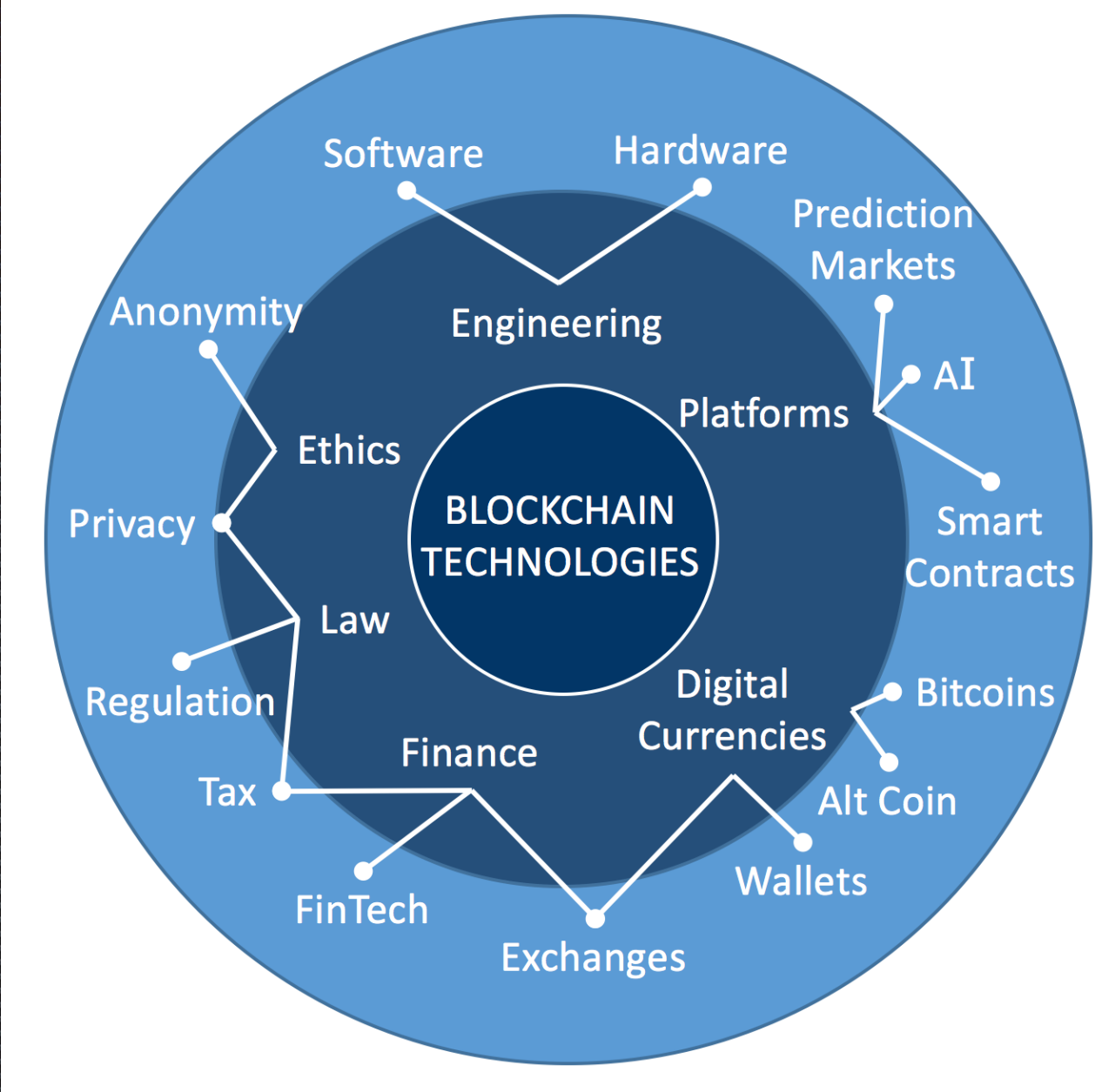
What's in the bitcoin blockchain?

[View post](#)



Ethereum and Smart Contracts

[View post](#)

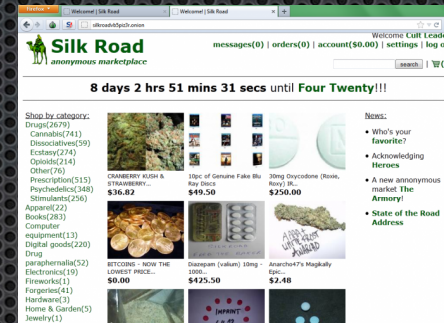
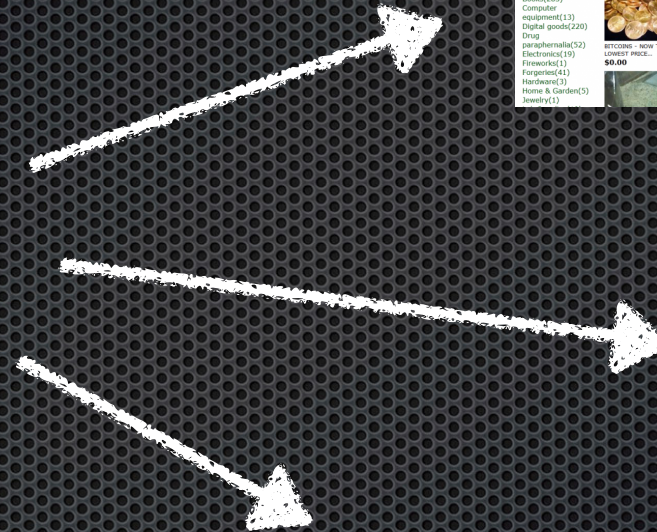


Bitcoin History

- DigiCash - 1990
- CRASH (CRypto cASH) - 1991
- e-gold - 1996
- b-money - 1998
- Bitgold - 1998

- <https://en.wikipedia.org/wiki/Cryptocurrency>
<http://antifraudintl.org/threads/the-history-of-digital-currency.88037/>

Bitcoin History cont



DIGITAL GOLD

BITCOIN AND THE
INSIDE STORY OF
THE MISFITS AND
MILLIONAIRES TRYING
TO REINVENT MONEY

NATHANIEL POPPER

9899
1884
188A
2007
200J
202A
40721
1A000
1A018
7028
77723
84048
42242
803P
8048
779P
2001
80001
77905
2A080
6700F2
2A080
8A087
200003
2000329
2001A4
2002A
2002A8
A0801
18A
80
80
808
180C
78A
78A
200F
2001
40721
1A000
1A018
7028
77723
84048
42242
803P
8048
779P
2001
80001
77905
2A080
6700F2
2A080
8A087
200003
2000329
2001A4
2002A
2002A8
A0801
18A
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80
808
180C
78A
78A
200F
2001
40721
1A000
1A018
7028
77723
84048
42242
803P
8048
779P

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What is a Blockchain?

- ✦ Distributed
- ✦ Peer to peer
- ✦ Ledger
- ✦ Decentralized

First blockchain txn

A single block

Magic Number Block Size Block Header

```
[cloudnthings:blocks cloudnthings$ hexdump -n 304 -C blk00000.dat
00000000 f9 be b4 d9 1d 01 00 00 01 00 00 00 00 00 00 00 .....
00000010 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000020 00 00 00 00 00 00 00 00 00 00 00 00 3b a3 ed fd .....;...
00000030 7a 7b 12 b2 7a c7 2c 3e 67 76 8f 61 7f c8 1b c3 |z{...z.,>gv.a...|
00000040 88 8a 51 32 3a 9f b8 aa 4b 1e 5e 4a 29 ab 5f 49 |..Q2:...K.^J)._I|
00000050 ff ff 00 1d 1d ac 2b 7c 01 00 00 00 01 00 00 .....+|.....
00000060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ff ff .....
00000080 ff ff 4d 04 ff ff 00 1d 01 04 45 54 68 65 20 54 |..M.....EThe T|
00000090 69 6d 65 73 20 30 33 2f 4a 61 6e 2f 32 30 30 39 |imes 03/Jan/2009|
000000a0 20 43 68 61 6e 63 65 6c 6c 6f 72 20 6f 6e 20 62 |Chancellor on b|
000000b0 72 69 6e 6b 20 6f 66 20 73 65 63 6f 6e 64 20 62 |rink of second b|
000000c0 61 69 6c 6f 75 74 20 66 6f 72 20 62 61 6e 6b 73 |ailout for banks|
000000d0 ff ff ff ff 01 00 f2 05 2a 01 00 00 00 43 41 04 |.....*....CA.|
000000e0 67 8a fd b0 fe 55 48 27 19 67 f1 a6 71 30 b7 10 |g....UH'.g..q0..|
000000f0 5c d6 a8 28 e0 39 09 a6 79 62 e0 ea 1f 61 de b6 |\. (.9..yb...a..|
00000100 49 f6 bc 3f 4c ef 38 c4 f3 55 04 e5 1e c1 12 de |I..?L.8..U.....|
00000110 5c 38 4d f7 ba 0b 8d 57 8a 4c 70 2b 6b f1 1d 5f |\8M....W.Lp+k..._|
00000120 ac 00 00 00 00 f9 be b4 d9 d7 00 00 00 01 00 00 .....

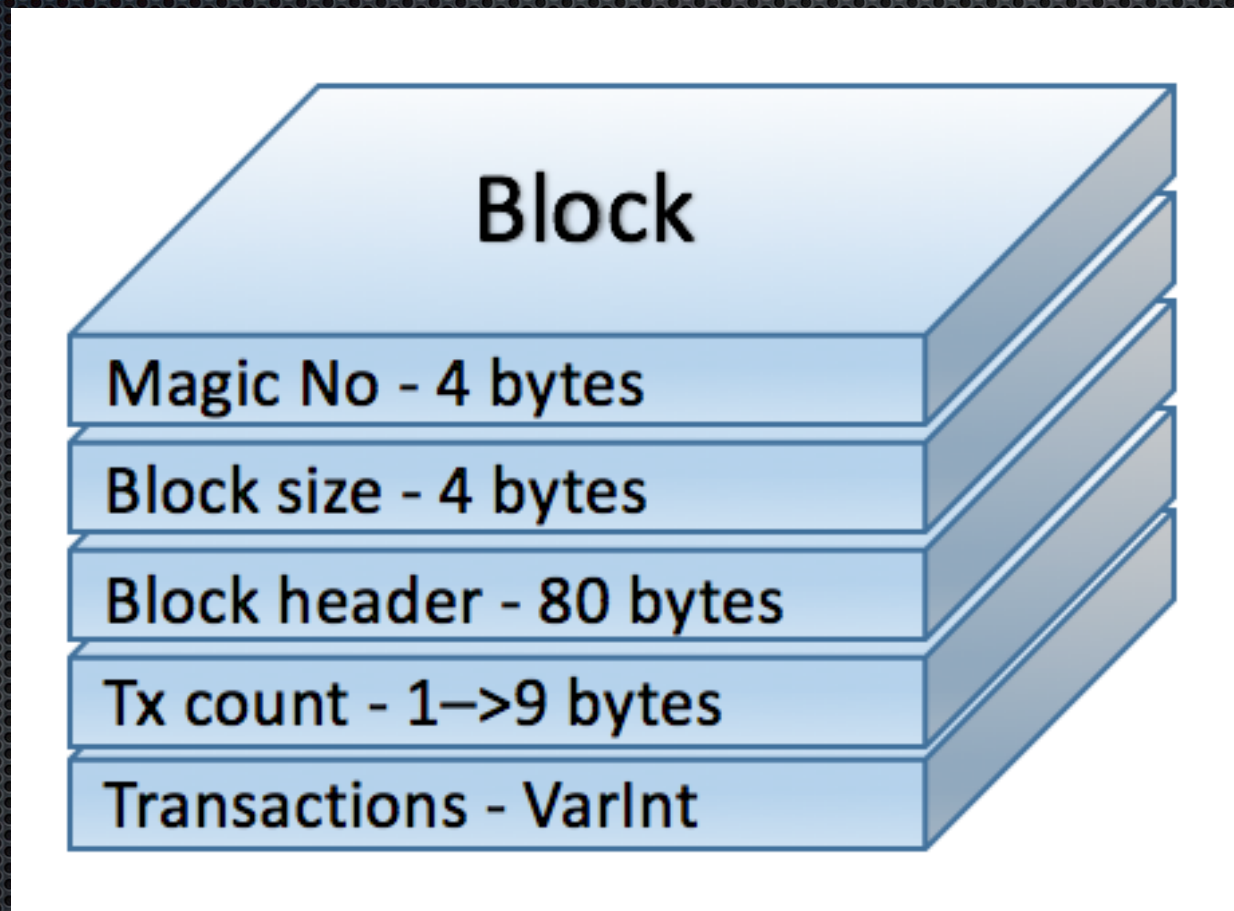
```

Transaction Magic Number of next block

@cloudnthings

Source: <https://www.anintegratedworld.com/whats-in-a-block/>

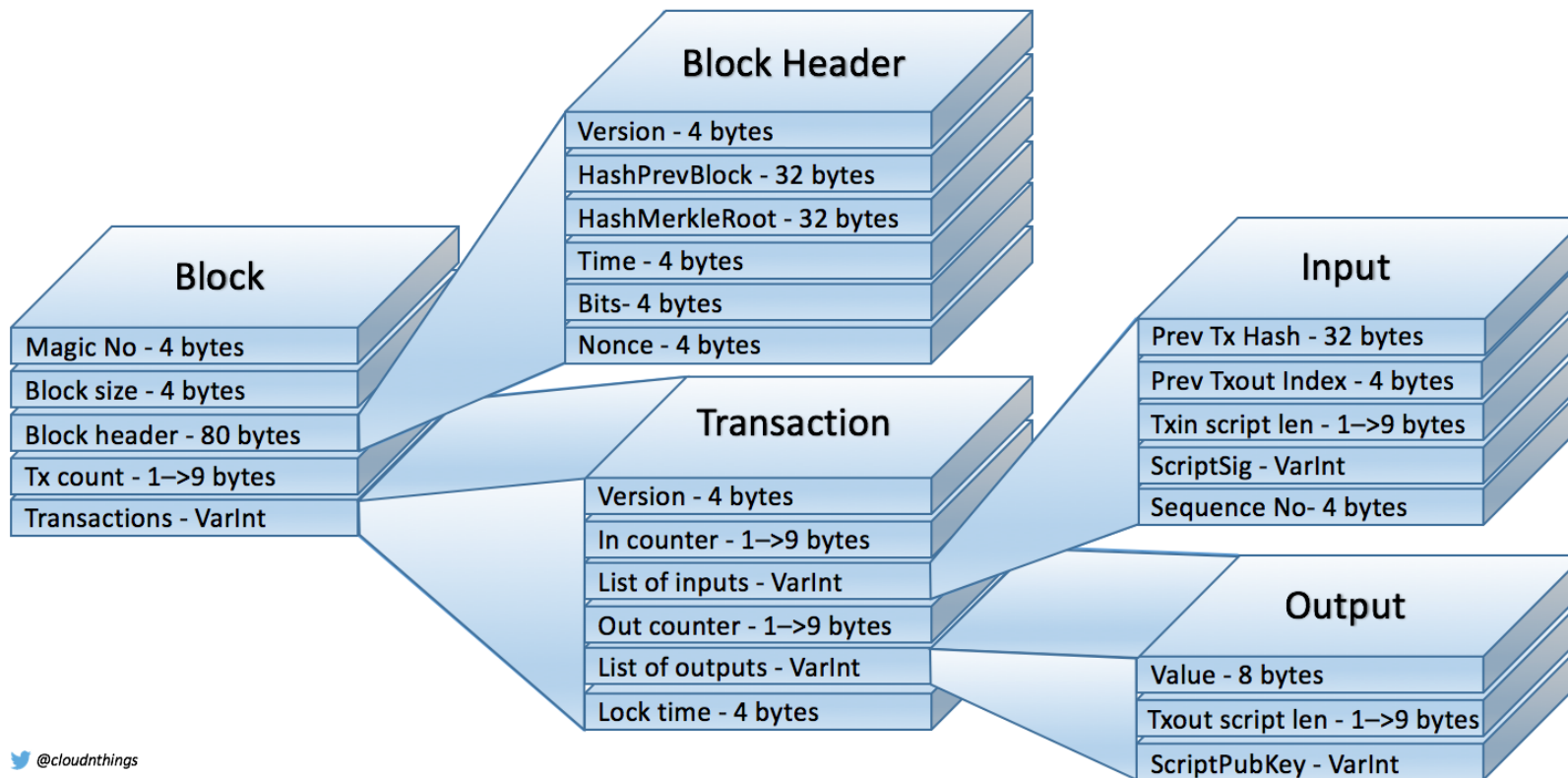
A block



- <https://www.anintegratedworld.com/whats-in-a-block/> (Feb 2016)

Anatomy of a Blockchain

The Anatomy of a Block Chain Block



[@cloudnthings](#)

Let's clarify the meaning of
Blockchains

Types of Blockchains

- ✦ Public Blockchain
- ✦ Private Blockchain
- ✦ Permissioned
- ✦ Permissionless

Securing the Blockchain

- ✦ Distributed nodes around the world
- ✦ Racing to solve a puzzle
 - ✦ <http://www.talkcrypto.org/blog/2016/07/27/going-pow-on-the-blockchain/>
- ✦ Energy in the form of electricity
- ✦ Reward is given in return

Nodes Around The World

GLOBAL BITCOIN NODES DISTRIBUTION

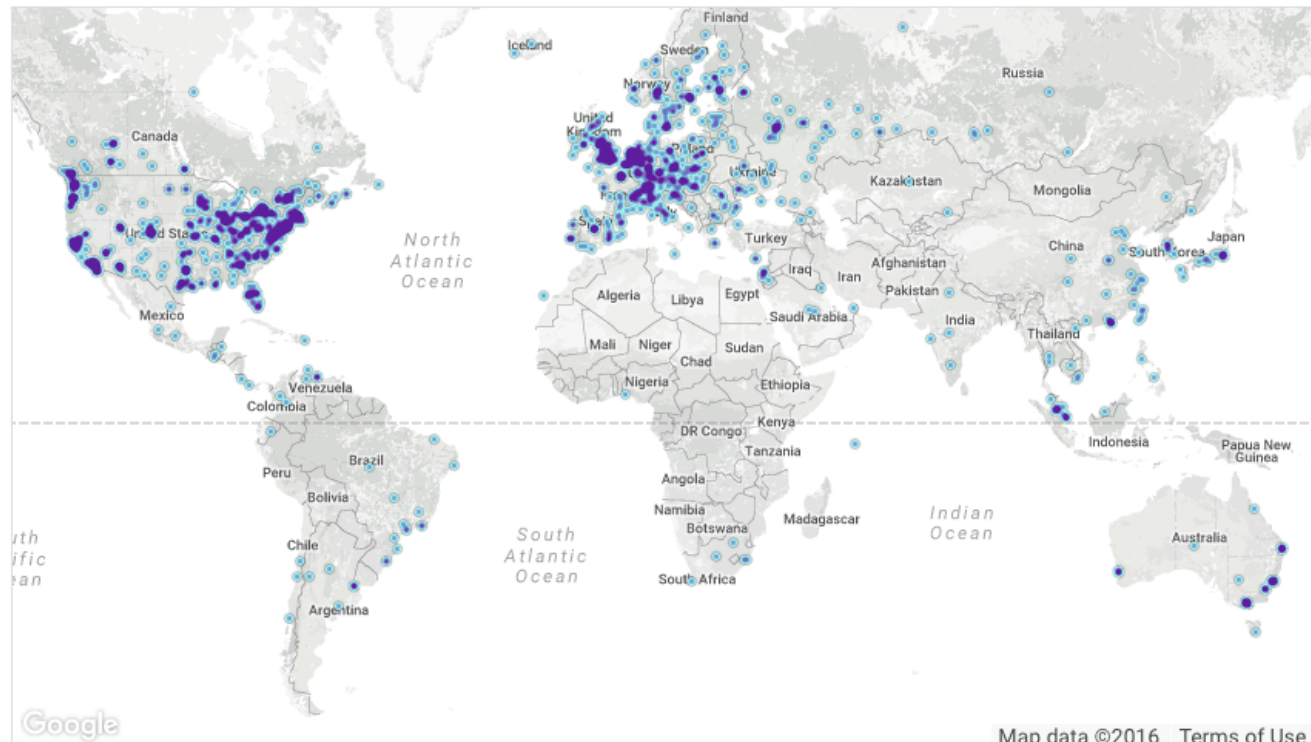
Reachable nodes as of Mon Oct 10 2016
12:54:28 GMT+1300 (NZDT).

5102 NODES

24-hour charts »

Top 10 countries with their respective number of reachable nodes are as follow.

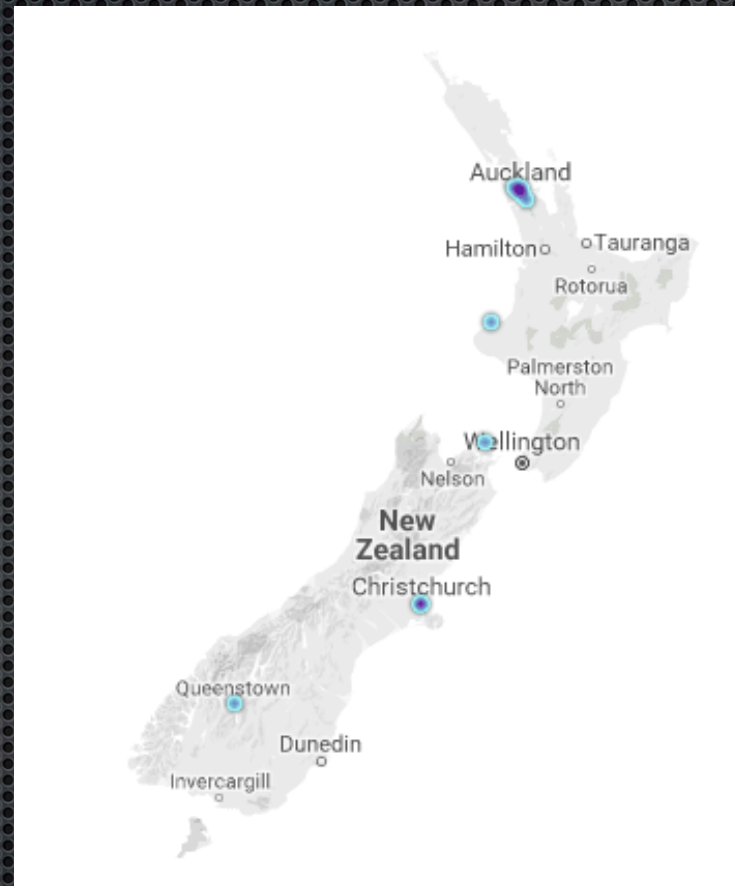
RANK	COUNTRY	NODES
1	United States	1422 (27.87%)
2	Germany	858 (16.82%)
3	France	438 (8.58%)
4	Netherlands	290 (5.68%)
5	Canada	258 (5.06%)
6	United Kingdom	216 (4.23%)
7	China	160 (3.14%)
8	n/a	159 (3.12%)
9	Russian Federation	131 (2.57%)
10	Sweden	83 (1.63%)



Map shows concentration of reachable Bitcoin nodes found in countries around the world.

LIVE MAP

Nodes in NZ



DEMO

Summary

- ✦ Bitcoin history
- ✦ How to understand Blockchains
- ✦ Types of blockchains
- ✦ How transactions are secured on the blockchain