Basic Bitcoin Tech: Bitcoin Nodes

Host - Simplest Bitcoin Book w/ Portland.HODL

- Overview -

Topics

- What is a Bitcoin node.
- What do nodes do?
- Types of nodes.
- How to run a node.
- Extending your node.
- Privacy

What is a Bitcoin Node?

Definition

- “A full node is a program that fully validates transactions and blocks. Almost all full nodes also help the network by accepting transactions and blocks from other full nodes, validating those transactions and blocks, and then relaying them to further full nodes.” - *Bitcoin.org*
- Tl;dr A bitcoin node is a ‘server’ that fully validates transactions and blocks.

What software do nodes use?

Nearly all nodes on earth run some variation of the software ‘Bitcoin Core’. There are various versions of Bitcoin Core available but all full nodes are compatible with each other and capable of relaying transactions and the validating the timechain.

Current distribution of Node ‘Versions’

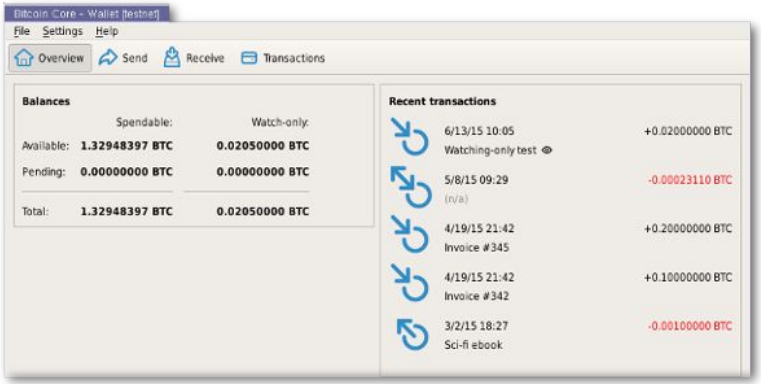
USER AGENTS | COUNTRIES | NETWORKS

Top 10 user agents with their respective number of reachable nodes.

RANK	USER AGENT	NODES
1	Satoshi:22.0.0	5735 (40.33%)
2	Satoshi:23.0.0	4424 (31.11%)
3	Satoshi:0.21.1	1459 (10.26%)
4	Satoshi:0.21.0	749 (5.27%)
5	Satoshi:0.20.1	503 (3.54%)
6	Satoshi:0.18.0	152 (1.07%)
7	Satoshi:0.20.0	145 (1.02%)
8	Satoshi:23.99.0	143 (1.01%)
9	Satoshi:0.18.1	86 (0.60%)
10	Satoshi:0.17.1	83 (0.58%)

All (81) »

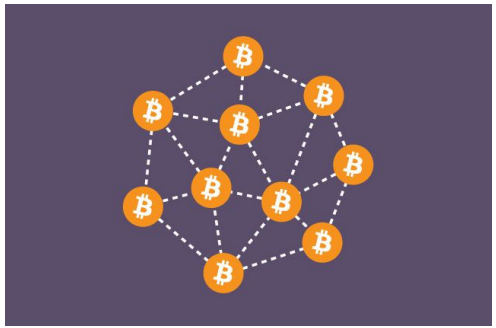
Satoshi:(xx.xx.xx) is a node that uses the Bitcoin Core reference implementation



What do nodes do?

Full nodes WILL ...

- Relay or Validate Bitcoin transactions.
- Validate newly minted blocks



Full nodes CAN ...

- Keep a copy of the timechain,
- Create block templates for miners.
- Share current and previous blocks with other nodes on the network.
- Generate wallets - addresses - and show users a bitcoin balance.
- Be used programmatically to get information about the timechain.

Hardware that can be used to run a node.

Bitcoin nodes can run on a variety of hardware.

- Raspberry PI (Small Single Board Computer)
- Laptops
- Desktop Computers
- Servers
- Anything that can run linux …

Advantages of different types of node hardware

Raspberry Pi - Small and Efficient

Raspberry Pi Advantages ✅

- Hands off after setup
- Small and compact
- Built in Wifi and Ethernet
- Extremely low power

Raspberry Pi Disadvantages ❌

- **SLOW - Very very very slow.**
- Right now they are very '*expensive*'
- Needs an external USB harddrive
- Primarily uses linux*
- Finicky - Lots of hardware combinations fans, sd cards, power supplies, etc ...

Laptops - Available and Fast*

Laptop Advantages ✅

- Faster than the Pi
- Built in battery
- Supports Windows / Mac OS / Linux
- Can be dual purposed.
- Built in WiFi / Ethernet.
- Many people have one.

Laptop Disadvantages ❌

- **Bulky**
- Configuring it to not shut off is annoying
- Uses more power than a Pi

Desktops and Servers - Available and Faster*

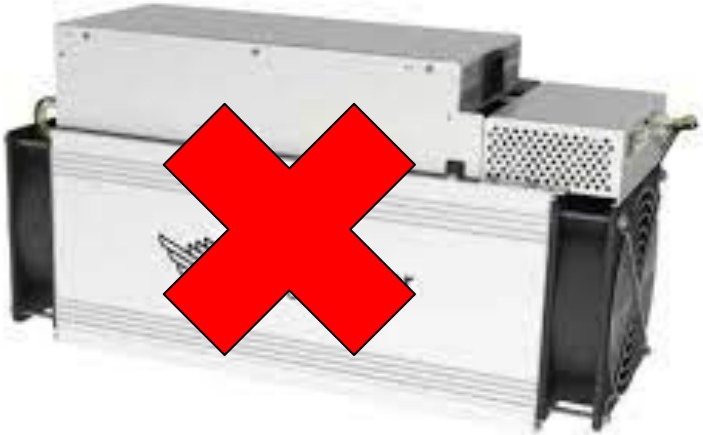
Desktop / Server Advantages ✅

- Ultra Fast - Huge Storage
- High availability
- Supports Windows / Mac OS / Linux
- Can be dual purposed.

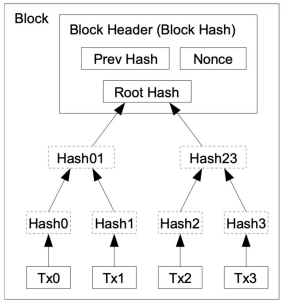
Desktop / Server Disadvantages ❌

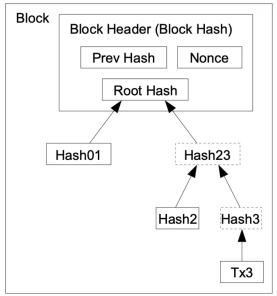
- **Incredibly Bulky**
- High power consumption
- Noisy

A miner uses a node but is not a node itself.



Types of nodes …





Types of Nodes

FULL NODE

Archival Node - AKA ‘listening node. A full node that contains the complete historical blockchain record going back to the Genesis block mined by Satoshi on Jan 3, 2009.

Pruned Node - A full node that substitutes part of each block with compacted blocks that are less data intensive.

LIGHT ‘NODE’ (Not really a node)

Light ‘Node’ - Does not contain a copy of the bitcoin ledger, and cannot validate transactions in the same way that a full node can.

Why run a node …

Reasons to run a node

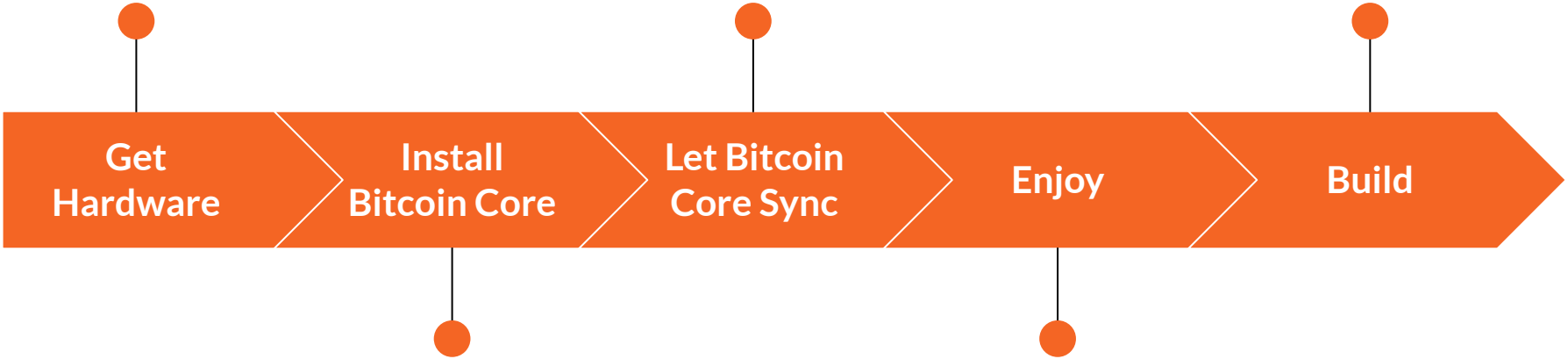
1. Privacy
2. Trustlessly confirm your transactions
3. Help secure the network
4. Enforce the ruleset and defend Bitcoin from unwanted changes
5. Support the network by improving speed
6. Help bolster decentralization
7. Potential to become an ‘Uncle Jim’

How to run a node …

Determine the hardware you want to install Bitcoin Core on.

Let Bitcoin Core Sync the entire timechain. This can take up to a week on slower devices.

Start building cool stuff on top of your node!



Install Bitcoin Core

https://bitcoincore.org

You now are running a full node.

Some turn key solutions …

Umbrel

Ultra easy and a great place to get started - not perfect since Umbrel does have licensing terms that could be seen as restrictive.

Citadel

For all intents and purposes it's Umbrel with fully open source licenses… harder to install and setup.

Other options

Ronin Dojo - Plug and play option or DIY
Start 9 Labs - Embassy Plug and Play, or DIY
RaspiBlitz - DIY

Extending Your Node …

You can install apps that use Bitcoin Core

Lightning Nodes (LND - Core Lightning)

RTL - Ride the Lightning

BTC Pay Server

Custom Software

And much more!

Privacy And Your Bitcoin Node ...

Without using a proxy, VPN, or TOR, your node will expose it's ip v4/6 address.

This doesn't present a risk to funds but can allow anyone to get a rough estimate of your physical location within ~50 miles max.

Ideal to use a privacy protecting setup.

Privacy is necessary for an open society in the electronic age.
Privacy is not secrecy. A private matter is something one
doesn't want the whole world to know, but a secret matter
is something one doesn't want anybody to know. Privacy is
the power to selectively reveal oneself to the world. - Eric Hughes, A Cypherpunk's Manifesto, 1993

Thanks For Listening.

1. Questions or Comments? Please ask to come on stage.
2. Anything incorrect please comment on the slide in question.