

# Bitcoin Node: Software, Hardware and DIY

## Fullnode and Manual Installation

Valerio Vaccaro

Satoshi Spritz Milano

March 11, 2025

- 💻 Bitcoin Developer and Hardware Expert
- 🔥 Contributor to Bitcoin open source projects
- ⚠️ DIY hardware enthusiast
- Bitcoin and Liquid Engineer at Blockstream

## Social

- 👤 **LinkedIn** [linkedin.com/in/valeriovaccaro](https://www.linkedin.com/in/valeriovaccaro)
- 🐙 **Github** [github.com/valerio-vaccaro](https://github.com/valerio-vaccaro)
- **Telegram** [t.me/valeriovaccaro](https://t.me/valeriovaccaro)



This presentation is distributed under the Creative Commons [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/) license.

Images used in this presentation are property of their respective authors and are included for educational and illustrative purposes only.

May this presentation inspire you to become more self-sovereign!





SATOSHI  
SPRITZ





imgflip.com

- 📄 Software overview (Umbrel, MyNode, Start9)
- ⚙️ Hardware and requirements
- 🔧 DIY Node: manual installation
- 🔑 Bitcoin Core, Electrs, Mempool
- 🏠 Tor and privacy
- 📚 Resources

# Why Run a Bitcoin Node?

SATOSHI  
SPRITZ

## Validation and Privacy

-  **Validate** the entire Bitcoin chain
-  **Check** wallet balance without third parties
-  **Broadcast** your own transactions
-  Maximum privacy, no trust in external services

SATOSHI  
SPRITZ

## Pre-built Solutions

Software	Price	Features
<b>Umbrel</b>	Free SW, HW 100-300€	Most user-friendly, app marketplace, Apple-like
<b>MyNode</b>	Free / 79€ premium / 399-599€ pre-built	Node + Lightning + Electrum + block explorer
<b>Start9</b>	699-899€ plug-and-play / Free SW DIY	Open source, built-in Tor, no telemetry

## Common Requirements

- 📈 **Blockchain:** ~670+ GB (2025), grows ~1 GB every few days
- 💻 Min 4GB RAM, 1TB SSD (2TB recommended)
- ⌚ Initial sync: 2-7 days




## Pre-built Solutions

- ✓ Quick setup, graphical interface
- ⚠ Docker, scripts, security checks hidden
- 👁 Additional software hard to audit





## DIY Node (Manual)

- 🛡 Less software = smaller attack surface
- 🔑 Full control over every component
- 📖 Learning and maintainability





## Minimum Requirements

-  Min 2GB RAM (4GB recommended)
-  At least 1TB disk (2TB recommended)
-  Multi-core CPU (any recent CPU)

## Options

-  **Old PC**: zero cost, remove battery if laptop
-  **Raspberry Pi**: expensive, USB disk = less stable
-  **Odroid-M1**: ARM with internal SSD slot
-  **Thin Client** (30-100€): Fujitsu Futro s920, HP t620

## Debian 13

-  Linux LTS, multi-year support
-  Update all packages
-  Install tor and ssh for remote maintenance
-  UPS (uninterruptible power) recommended

## Download and Verify

```
wget https://bitcoincore.org/bin/bitcoin-core-28.1/bitcoin-28.1-x86_64-linux-g
```

```
wget https://bitcoincore.org/bin/bitcoin-core-28.1/SHA256SUMS
```



```
wget https://bitcoincore.org/bin/bitcoin-core-28.1/SHA256SUMS.asc
```

- 🔑 Verify hash: `sha256sum --ignore-missing --check SHA256SUMS`
- ✅ Verify signatures: `gpg --verify SHA256SUMS.asc`
- ⚙️ ARM: use `bitcoin-28.1-aarch64-linux-gnu.tar.gz`

## bitcoin.conf (home setup)

```
daemon=1
blocksonly=1
maxconnections=20
maxuploadtarget=500
txindex=1
blockfilterindex=1

rpcallowip=0.0.0.0/0
rpcbind=0.0.0.0
rpcuser=username
rpcpassword=password
```

-  Full config: [jlopp.github.io/bitcoin-core-config-generator](https://jlopp.github.io/bitcoin-core-config-generator)
-  Core 26+: v2transport for P2P encryption

## bitcoind service

```
sudo systemctl enable bitcoind
```

```
sudo systemctl start bitcoind
```

```
systemctl status bitcoind
```

- 🔑 Dedicated bitcoin user
- ✅ Auto restart, log in `~/ .bitcoin/debug.log`

## Electrum Server (Rust)

- ⚙️ Install Rust, clang, build-essential
- 🔗 git clone from [github.com/romanz/electrs](https://github.com/romanz/electrs)
- 🔑 Verify signature: `git verify-tag v0.10.5`
- ✅ `cargo build --locked --release`

## config.toml

```
auth = "username:password"  
daemon_rpc_addr = "127.0.0.1:8332"  
electrum_rpc_addr = "127.0.0.1:50001"  
network = "bitcoin"
```

## Core Lightning (CLN)

- ⚡ Lightning Network for payments
- 📖 Configuration in separate lessons

## Mempool.space

- 📄 Self-hosted block explorer
- ⚙️ MariaDB, Node.js, backend + frontend
- 🖥️ pm2 for process management

## Hidden Service

- 📦 `sudo apt install tor`
- 🔑 Configure `torrc` for hidden service on port 8333
- 🛡️ `bitcoin.conf: onlynet=onion, proxy=127.0.0.1:9050`

## Verify

```
bitcoin-cli getnetworkinfo
```

```
bitcoin-cli getpeerinfo
```

- ⚠️ Tor is slow: initial sync much longer

## For Learning

- 🪙 Tokens without value, minimal fees
- 📈 Fluctuating mining, variable difficulty
- ✅ Wallets: Green, Electrum, Specter, Sparrow

## Useful Tools

- 🔗 [BTCBouncer](#): testnet payments
- 🔑 [BTCSigner](#): testnet multisig

## Main Commands

- 📄 Blockchain: `getblockcount`, `getblockchaininfo`, `getblock`
- 🔗 Network: `getnetworkinfo`, `getpeerinfo`
- 🗑️ Wallet: `getbalance`, `sendtoaddress`, `listunspent`
- ⚙️ Raw: `createpsbt`, `decodepsbt`, `signrawtransactionwithwallet`

## Format

```
bitcoin-cli [options] <command> [params]
```

```
bitcoin-cli help
```

## Officine Bitcoin

- 🎓 Lessons: [officinebitcoin.it/lezioni/fulhar](https://officinebitcoin.it/lezioni/fulhar)
- 📖 Program: hardware, core, electrs, testnet, bitcoin-cli

## Learning

- 🔗 [Learning-Bitcoin-from-the-Command-Line](#)
- 📖 [bitcoincore.org](https://bitcoincore.org)

**NO HARD QUESTIONS,  
PLEASE...**

 **SATOSHI  
SPRITZ**

**SATOSHI  
SPRITZ**

- **Bitcoin Core:** [bitcoincore.org](https://bitcoincore.org)
- **Electrs:** [github.com/romanz/electrs](https://github.com/romanz/electrs)
- **Mempool:** [mempool.space](https://mempool.space)
- **Config:** [jlopp.github.io/bitcoin-core-config-generator](https://jlopp.github.io/bitcoin-core-config-generator)

-  Federation of local Bitcoin groups
-  Free and privacy-oriented events
-  BITCOIN ONLY
-  Weekly Satoshi Spritz Connect online

## Links

- [satoshispritz.it](https://satoshispritz.it)
- [t.me/SatoshiSpritzConnect](https://t.me/SatoshiSpritzConnect)

- 🇮🇹 Italian Community of Bitcoiners, completely free
- 🤖 BITCOIN ONLY
- 🎓 Focus on education and project development
- 📄 Projects: nodes, hardware wallet, open source, Debian, mnemonics

## Links

- [officinebitcoin.it](https://officinebitcoin.it)