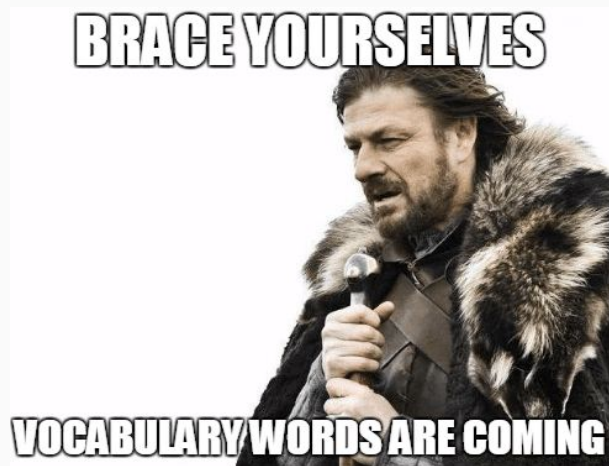


# **Costs / Rewards Calculator**

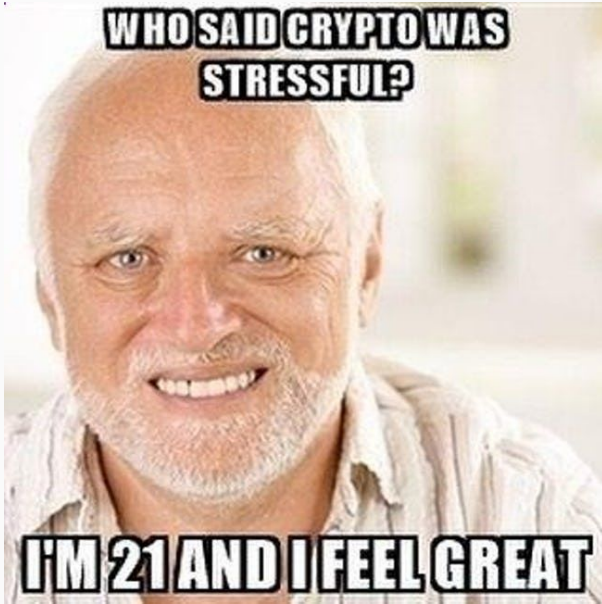
## **(The Basics – Terminology & Walk Through of Tools)**

# What You Will Learn From This



- Always do it for the Memes. There will be a lot of memes in this presentation.
- How to precisely calculate how many Lambo's you will own or when tricycle.
- Are validators more profitable than /r/wallstreetbets or all in on \$1000 front month call option on TSLA?

# Just Kidding, Key Takeaways



- Presentation will be less technical and more about economics.
- Profitability of common Proof of Stake Protocols from a Validators perspective.
- Calculating and Economics of Rewards.
- Current costs of running a Validator.
- Overview of Tools.
- Near future costs and profitability.
- Commoditization
- What the long term landscape might look like.
- Q&A

# Personal Background

- Found out about Bitcoin day after it launched - original mailing list.
- Almost bought the pizza for 10k bitcoins but needed the money for beer (was in college).
- GPU, FPGA, ASIC mining as early as 2010.
- Experienced and seen every major scam.
- Entered PoS ecosystem early.



# Who we are



Hendrik Hofstadt  
CEO

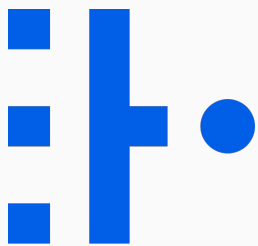


Leopold Schabel  
CTO

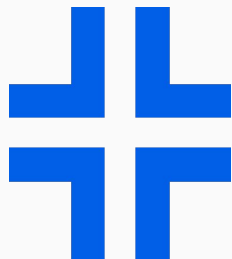


Richard Li  
COO

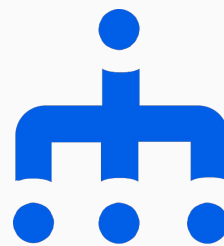
# What we do



**Validation**



**Support**



**SignOS**

# About Certus One

- Team is Based in San Francisco and Berlin
- Cosmo's Game of Stakes Winners (#1 across all 6 categories)
- Validator for a few networks and oracles.
- Low levels systems, network and security engineering.
- We work with a lot of funds and institutions to help them through the process of staking.
- We play at Defcon's Capture the Flag annually (7th this past year)

# Proof of Stake Variants

## Quick Overview of Proof-of-Stake Variants

POS BAKERZ <https://posbakerz.com/>  
@posbakerz

	DPoS	LPoS	BPoS	HPoS	Others
Voting Rights	 Vote for validators only	 Vote for protocol amendments	 Vote for protocol amendments	Depends on the protocol	Other alternatives include Masternode staking, Leased PoS, PoS Voting, Delegated BFT, and many more we cannot mention
Nb. Validators	 Limited in quantity and elected	 Min. bond size	 Limited in quantity and selected via stake size	 Min. bond size	
Security Sanctions	Terms of the sanction depend on the protocol	Yes, paid by the validator	Yes, paid by the validator & <b>delegator</b>	Terms of the sanction depend on the protocol	
Examples	Lisk EOS Steem Bitshares	Tezos	Cosmos IRISnet	Decred Hcash Ethereum Casper	



# Highest Requirements – Validators on Tendermint (Cosmos)










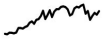










- Why Cosmos?
  - Difficult to run a highly available and secure validator.
  - Brutal slashing conditions.
  - Currently is the “bar” of validators. Most other chains are far simpler.
  - One of the largest and most diverse set of validators.
    - As a result, it is the best live chain for costs/rewards/risk comparison. Demonstrates the best adversarial conditions.

# How Validators Make Money

- Commission rates
  - Validators charge a commission rate. This ranges from 0% to as high as 100%.
  - What is the commission rate?
    - It's "generally" a small fee validators charge their delegators to provide the service.
    - For example. The annual Inflation rate of Cosmos is currently 8.27% ("yield" in more simple terms). If a user staked 1,000 ATOMs for a year to a validator that charges 5% commission. How many Atoms would the validator earn?
      - Answer:  $1,000 * 0.0823 * 0.05 = 4.115$  ATOMs.



# Show me the Money (Current Protocol Profitability)

Asset	Price	Reward	Adj. Reward	Market Cap	24h Volume	Total Staked	7d Price Change	Score
 Tezos XTZ	\$0	5.83%	0.76%	\$1,172,749,785	\$52,067,922	78.33%		★★★★★
 Cosmos ATOM	\$ 4.4 (-2.00%)	8.23%	1.71%	\$830,433,500	\$165,210,455	73.31%		★★★★★
 Livepeer LPT	\$ 2.43 (-9.67%)	63.20%	18.24%	\$15,860,447	\$46,107	64.03%		★★★★★
 Synthetix Netw SNX	\$ 1.18 (2.61%)	57.97%	57.97%	\$107,169,224	\$1,183,587	80.03%		★★★★★
 Decred DCR	\$ 18.99 (-0.26%)	8.33%	3.77%	\$209,527,992	\$109,308,724	51.16%		★★★★★
 Waves WAVES	\$ 0.8862 (3.82%)	6.28%	3.15%	\$88,589,599	\$81,721,311	52.97%		★★★★★
 Fantom FTM	\$ 0.00922 (4.86%)	56.00%	31.28%	\$19,427,976	\$3,663,830	39.73%		★★★★★
 ICON ICX	\$ 0.2618 (3.54%)	17.70%	11.70%	\$135,875,311	\$46,027,075	26.29%		★★★★★
 IOST IOST	\$ 0.00571 (1.59%)	11.29%	7.29%	\$68,618,163	\$40,382,527	17.72%		★★★★★
 Loom Network LOOM	\$ 0.0186 (8.07%)	17.00%	2.00%	\$15,501,249	\$3,749,823	38.14%		★★★★★

# How Validators Decide on Commission Rates

- Infrastructure / Costs / Operations
- Risk
- Contributions
- “The Peoples Validator”
- Different demographic
- Copy others
- Attracting delegators
- A lot are investment funds / exchanges



# Comparison of Validator Profitability

- Cosmos

- #1 Largest Validator
  - Stakefish 12,445,540 - 4%
    - 40,970 per year. **\$180,268.**
- #20th Validator
  - Huobi Pool 2,748,323 - 0%
    - 0 per year. **ZERO.**
- #50th Validator
  - Mythos 761,788 - 15%
    - 9,404 per year. **\$41,378.**
- #100th Validator
  - Grant.Fish 100,060 - 100%

Current ATOM price - \$4.40

Current inflation (yield) - 8.23%

- Tezos

- #1 Largest Validator
  - Tezos Capital Legacy 10,197,669 - 15%
    - 84,283 per year. **\$141,596.**
- #20th Validator
  - Shake n Bake 670,145 - 10%
    - 36,924 per year. **\$62,033.**
- #50th Validator
  - Tezos Kitchen 606,051 - 8%
    - 33,393 per year. **\$56,100.**
- #100th Validator
  - HODL Farm 103,522 -5%
    - 5,704 per year. **\$9,582.**

Current TEZ price - \$1.68

Current inflation (yield) - ~5.51%

# Key Takeaways

- An unproportionate amount of profit is concentrated on the top validators.
- It's not so easy to make money - don't quit your day job.
- Fierce competition from 0% commission validators.
- Not a venture scale business.

# Validator Costs

Let's break them down to 3 tiers first

- Professional
  - Multiple full-time employees with deep technical knowledge and experience.
  - Professional setup with redundancy, security, risk management, legal, HSMs, etc.
  - Most run own hardware in datacenter and/or expensive cloud setups.
  - Typically charges the highest commission rates
- Small Group
  - Typically half the team is part time, or have other priorities.
  - Are not expert engineers in the required field, instead learning on the go. Example. front end engineer by day.
  - University group, 2-3 man teams etc.
- Enthusiast
  - Casually doing it for fun, passion or idealism.

# Validator Cost Estimation (Example)

- Top Cosmos Validator (excluding salaries)
  - Crazy Setup - Enterprise grade hardware, HSMs, security, processes, redundant, custom tooling - ~\$15k+ month with \$50k+ upfront costs. High personnel costs.
  - Professional - Enterprise grade hardware, HSMs, security, multi-redundant, sentries - \$3-10k a month - \$10-\$35k upfront costs.
  - Average - Physical hardware or cloud, HSMs, security, single-redundant - \$2 - 8k a month - \$10k upfront cost
- Small Group
  - Excellent - Physical hardware but mostly cloud, HSM (or cloud HSM), single or no redundancy - \$2-5k a month - \$5-10k upfront cost.
  - Average - Physical hardware in cheap/free location, HSM or no HSM, no redundancy.
- Enthusiast
  - Standard - Macbook pro, old computer or \$50 a month Digital Ocean droplet. Windows 95 PC.



## Average Professional Validator Cost Breakdown (No Personnel costs and conservative estimates)

- Physical hardware
  - Dell Server \$5-7k, HSMs \$750 (yubikey), other hardware expenses \$1k
- Datacenter
  - Cabinet at Equinix ~\$1500. Secured cage \$3k+ per month.
- Sentries
  - \$100+ per month. Ex. Need 4-5 for Cosmos
- Tooling/Monitoring/Development time
  - Can do it yourself but hiring people for this is expensive. Ex. Arguably somewhat equivalent to a backend engineer at google ~\$250k salary in the bay area.
- Backups
  - Most professional companies have a second datacenter with a server on standby so nearly doubling the cost of hardware, datacenter etc.
- Total: Hardware ~\$12.75k (x2 - \$25.5k), ongoing costs - \$2k per month (x2 - \$3.5k a month)

# Validator Revenue vs Costs

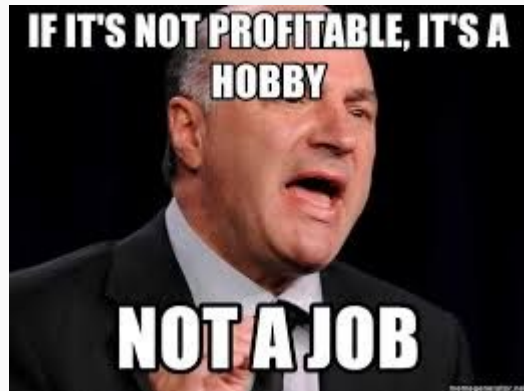
- Professional
  - #1 Largest Validator
    - Stakefish 12,445,540 - 4%
      - 40,970 per year.  $\$180,268 / 12 = \$15,022$  per month
  - Chorus One - #12
    - 4,983,411 - 7.5%
      - 30,760 per year.  $\$135,344 / 12 = \$11,278$  per month
- Factor in Engineering Salaries
  - 2x engineers \$120k USD per year salaries - \$10k per month = \$20k per month total
    - In the red quickly.
      - Hard to hire someone on-call 24/7 and professional teams have at least 2 people.
- Total: Hardware ~\$12.75k (x2 - \$25.5k), ongoing costs - \$2k per month (x2 - \$3.5k a month)

## Why are some validators charging 0% commission and/or losing money?

- Most are funds / exchanges or self staking.
- Some offer low commission to attract delegations and raise rates later. Ex. Sikka - 10.4m atoms and nearly the same amount after increasing to 3% commission from 0% (formerly known as the people's validator)
- Some are VC backed and can set money on fire.
- They might be losing money on one chain and making more on others
- “Marketing” “We are on every chain”
- Low cost of living countries / locations and/or part time teams.
- Binance style vs Coinbase

# Being a Profitable Validator Company

- Keeping costs low while maintaining security.
- Multiple chains / economies of scale.
- Offers products or services.
- Be based abroad (not in the US).
- Participate in staking competitions and receiving bounties.



- The biggest barrier is simply the cost and expertise - SignOS
  - 60+% decrease in costs. Dramatically improved availability/security. Allows nearly anyone with basic system admin skills to run top tier validator.

# Expected Near Future

- Shared security
- Software that makes it easier and dramatic decrease in costs
- SignOS - University Groups
- Commoditization
- Exchanges, custodians, funds dominate more
- Decrease in rewards
- Securitization
- Financial Products - Yay Boomers!!



# Tools and Resources

- <https://www.stakingrewards.com/>
- <https://www.stakingrewards.com/calculator>
- <https://stargazer.certus.one/validators>
- <https://mytezosbaker.com/>
- <https://imgflip.com/memegenerator>
- <https://news.bitcoin.com/the-top-50-crypto-memes-of-all-time/>



# Thank you! Q&A

Learn more at **Certus.One**

**Richard@Certus.one**

Follow me on Twitter: **@Megatron**

