Bittensor

The Internet of Machine Intelligence

A factual primer on TAO, decentralized AI markets,
and protocol-level intelligence infrastructure.

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How to read this primer

This is an educational explainer about the Bittensor protocol. It describes how the network works, what TAO is, and how to evaluate Bittensor on its own terms.

WHAT IT IS	A technical and structural overview of Bittensor, written for a sophisticated reader who has not previously studied the network.
WHAT IT IS NOT	A recommendation to buy any crypto asset, a description of any xTensor product or fund, or a forecast of the price or returns of TAO.
HOW IT IS BUILT	Every quantitative claim is sourced and dated. Open questions are flagged. Risks are addressed prominently and on their own merits.

Why now

Machine intelligence is becoming an input to decisions. The question is whether it can also be an open market.

Frontier AI today is produced and distributed by a small number of private laboratories. Model weights, training data, evaluation pipelines and customer relationships are concentrated by design. This is a coherent commercial structure; it is not the only possible one.

Bittensor is the most-developed attempt to coordinate the production of machine intelligence through open, on-chain protocol rules rather than through firms. This primer describes how that protocol works.

Closed by design in today's frontier-AI stack.

Source: Bittensor documentation; xTensor structural synthesis, May 2026.

DEFINITION

Bittensor is a protocol that turns useful machine-intelligence work into an on-chain market.

Subnets	specialised on-chain markets define the task and the scoring rule.
Miners	compete to produce outputs — models, responses, agents, compute, data.
Validators	score those outputs; the protocol aggregates their judgments.
TAO	is emitted by protocol rules and routed to participants judged useful.

Source: Bittensor documentation; protocol overview.

The crypto lineage

Three protocols, three primitives, three new markets.

2009

Bitcoin

scarcity

A fixed monetary asset, settled by proof-of-work consensus. Coordinates global production of secure ledger state.

2015

Ethereum

contracts

Programmable settlement. Generalises the substrate from a single asset to any rule expressible as code.

2021

Bittensor

intelligence

Programmable machine-intelligence labour markets. The rule is now "useful output," judged by stake-weighted consensus.

Source: Bitcoin, Ethereum, Bittensor whitepapers and documentation.

Organizing primitive

Three ways human work has historically been coordinated. Bittensor is in the third.

GOVERNMENT

Sovereign authority

Can censor, seize, suspend, conscript. Bounded by territory.

CORPORATION

Private authority

Can be captured, regulated, dissolved. Bounded by jurisdiction and cap table.

NETWORK

Protocol authority

Borderless and permissionless. Bounded only by what the protocol can verify.

Bittensor applies network coordination — already proven by Bitcoin and Ethereum — to the production of useful intelligence.

Source: Bittensor white paper; xTensor synthesis.

The operating loop

Three roles. One cycle. Repeated every block.

01

Subnet owner

Defines the task.

Specifies the work — inference, training, storage — and the rule by which miner output is judged.

02

Miners

Produce the work.

Submit models, responses, compute or data. Rewards track how outputs score in validator rankings.

03

Validators

Rank the outputs.

Run the scoring rule and emit weight vectors. The protocol aggregates them into a stake-weighted consensus.

Source: Bittensor documentation: subnets, miners, validators.

Yuma Consensus

How the protocol turns disagreement among validators into emission weights.

01

Miner outputs

Task-specific work enters a subnet.

02

Validator rankings

Each validator scores miner outputs and emits a weight vector.

03

Consensus clipping

Outlier weights are clipped toward the stake-weighted consensus.

04

Emissions & bonds

TAO is paid to aligned miners and validators; bonds update.

YC3 + LIQUID ALPHA

The most recent consensus upgrade adds tighter outlier clipping and stronger validator bonding, which correlates validator dividends more directly with the miner performance they identified.

Source: Bittensor documentation: Yuma Consensus, YC3 and Liquid Alpha.

Dynamic TAO

Capital allocation between subnets is mediated by a live market.

SUBNET AMM

$$\text{TAO reserve} \times \text{alpha reserve} = k$$

TAO → ALPHA

staked into pool — *subnet token*

Price discovery happens continuously inside each subnet's pool.

01 **Allocation**

Stakers lock TAO into a subnet's pool. The pool mints subnet-specific alpha to the staker.

02 **Signal**

Each subnet's alpha price reflects live demand for that subnet's specific work.

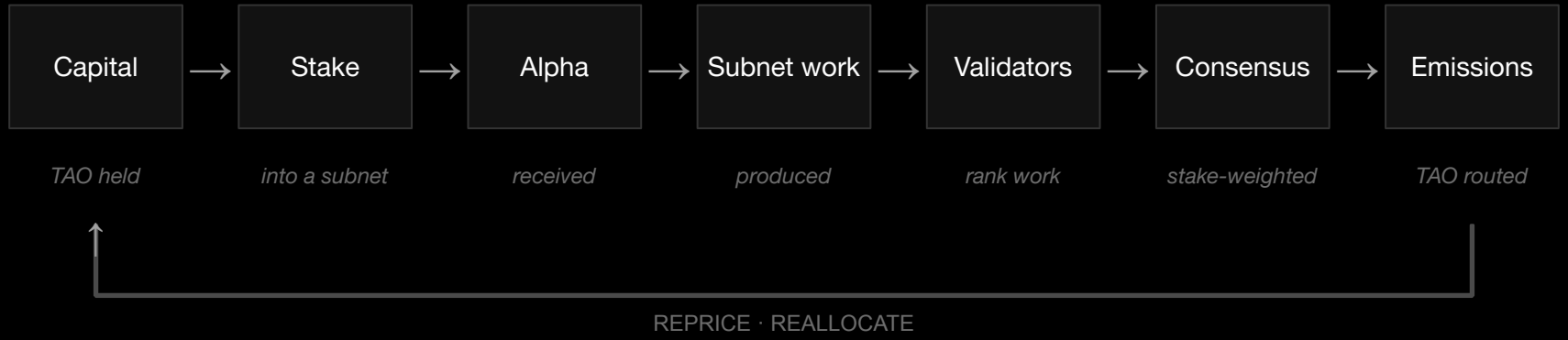
03 **Routing**

Net TAO inflows (smoothed as Taoflow) drive each subnet's share of protocol emissions.

Source: Bittensor Dynamic TAO guide; Bittensor emissions / Taoflow documentation.

The whole loop, in one picture

Capital allocates. Subnets produce. Validators score. Emissions reprice. Repeat.



Source: Bittensor protocol documentation; xTensor synthesis.

Subnets in practice

Each subnet is its own market, with its own task, scoring rule, and alpha token.

Inference

Chutes · Targon

Serve model outputs to external clients.

Training

Templar · Covenant-72B

Train large models across public-internet nodes.

Coding

Ridges · SWE-bench

Compete on software-engineering tasks.

Compute

Lium · H100 supply

Permissionless GPU markets priced in TAO.

Storage

Hippius

Object storage with on-chain proofs of retrievability.

Specialty

Forecasting · ads · agents

Long tail of narrow markets; a few define new categories.

Source: Bittensor documentation; CoinCodex subnet explainer, April 2026.

Signals of external demand

A useful question to ask of any decentralized network: who is paying for the output, and how do we know?

INFERENCE

Chutes (SN64)

Publishes per-model request volumes; external API keys a measurable share of traffic.

INFERENCE

Targon

OpenAI-compatible inference endpoint, settled in TAO; usage on the dashboard.

TRAINING

Teutonic (formally Templar)

Open weights re-deployed off-network; cited by independent benchmarks.

WHAT TO LOOK FOR

- External API traffic, where it is published.
- Off-network deployment of subnet weights and datasets.
- Third-party benchmarks that cite subnet outputs.
- Recurring on-chain payments from non-validator addresses.

Demand for subnet output is the strongest signal that the protocol is producing something useful.

Source: subnet operator dashboards; illustrative — figures require verification.

A technical reference point

Covenant-72B is a March 2026 large-model training run coordinated across independent public-internet nodes.

72B

PARAMETERS

Comparable scale to LLaMA-2-70B.

1.1T

TRAINING TOKENS

Across 70+ independent nodes.

Apache

MODEL LICENSE

Weights published on Hugging Face.

Why this matters: it is the first documented training run at frontier-comparable scale produced outside a single closed laboratory.

Source: Covenant-72B arXiv report; Hugging Face model card; Templar subnet references.

Token economics

Bitcoin-style monetary design. Intelligence-market emission destination.

21M

HARD CAP

Same terminal supply as Bitcoin.

0%

PREMINE

Fair launch; no foundation or insider allocation.

~3,600

TAO PER DAY

Post-December 2025 halving emission rate.

~75%

STAKED RATIO

Drives subnet allocation.

Any TAO holder can delegate stake to a validator and earn a share of that validator's emissions.

Source: Bittensor emissions documentation; CoinMarketCap snapshot, 19 May 2026.

Market context

Where the public Bittensor network sits today. Point-in-time figures, not valuation guidance.

128	$2.81B	Public
ACTIVE SUBNET CAP	TAO MARKET CAP	TAO TOKEN MARKET
Public reference; point-in-time.	CoinMarketCap, 19 May 2026.	Openly traded crypto asset.

WHAT IT IS

TAO is a permissionlessly-tradable crypto asset used as the reserve and incentive token of Bittensor. Subnet alpha tokens are subnet-specific crypto assets.

WHAT IT IS NOT

Neither TAO nor any subnet alpha is shares, a fund interest, a claim on xTensor, or equity in any operating entity.

Source: Bittensor documentation; CoinMarketCap TAO market data, 19 May 2026.

Risk register

Bittensor is an early-stage network. The following items are material and should be weighed carefully.

01 **Output-quality gap**

Many subnets lag frontier closed models.

02 **Productization gap**

Protocol outpaces interfaces, distribution, brand.

03 **Volatility**

Repeated 60%+ drawdowns from prior highs.

04 **Subnet selection**

Most subnets will fail; dispersion is high.

05 **Regulatory uncertainty**

Treatment of TAO and alpha is unsettled.

06 **Validator concentration**

Small validator sets can collude or be captured.

07 **Scale & governance**

Consensus and on-chain governance remain young.

Source: public market data; Bittensor documentation; xTensor risk framing.

What to watch

Four falsifiable questions a reader can track over the next six to twelve months to update their own view.

Q1

Does subnet output find paying external demand?

Track inference traffic from non-network addresses.

Q2

Does the capability frontier keep moving?

Training-run scale; independent benchmark scores.

Q3

Does the validator set stay decentralised?

Validator count; top-10 stake share.

Q4

Does regulatory treatment clarify?

FCA, SEC, MiCA guidance on TAO and alpha.

Each question is independently verifiable through public Bittensor data and third-party sources.

Takeaway

Carry this page away.

DEFINITION

Bittensor turns useful machine-intelligence work into an on-chain market. Subnets define tasks · miners produce · validators score · TAO routes the rewards.

STATE OF THE NETWORK

128 active subnet cap · 21M TAO hard cap · ~75% staked · $2.81B market cap · Covenant-72B decentralised 72B-parameter training run. (19 May 2026)

RISKS

Output-quality gap · productization · volatility · subnet selection · regulatory uncertainty · validator concentration · scale and governance.

WATCHPOINTS

External demand · capability frontier · validator decentralisation · regulatory clarification on TAO and alpha classification.

Every claim above is described and sourced earlier in the deck.

Glossary

Eight terms used throughout the primer.

Subnet	A specialised on-chain market: owner sets the task and the scoring rule.
Miner	Submits outputs — models, responses, agents, compute, data — into a subnet.
Validator	Scores miner outputs and submits weight vectors to the protocol.
TAO	Native crypto asset of Bittensor. Used for staking, fees, and emissions.
Alpha token	Subnet-specific token minted when TAO is staked into a subnet's pool.
dTAO	Mechanism that routes emissions between subnets based on net TAO inflows.
Yuma Consensus	Aggregates validator weights into a stake-weighted ranking; clips outliers.
Emission	Newly-minted TAO paid each block to subnet owners, miners, and validators.

Sources

External references used throughout the primer.

Slides 5, 8	Bittensor documentation: subnets, miners, validators.
Slide 6	Bitcoin and Ethereum whitepapers; Bittensor whitepaper.
Slide 9	Bittensor docs: Yuma Consensus, YC3, Liquid Alpha.
Slide 10	Bittensor Dynamic TAO guide; Taoflow documentation.
Slide 12	CoinCodex subnet explainer (April 2026); subnet directory.
Slide 13	Operator dashboards: Chutes (SN64), Targon; Templar refs.
Slide 14	Covenant-72B arXiv report; Hugging Face model card.
Slide 15	Bittensor emissions docs; CoinMarketCap, 19 May 2026.
Slide 16	CoinMarketCap TAO market data, 19 May 2026.
Slide 17	Public market data; xTensor risk framing.

Where a Bittensor documentation page is cited, the reader is referred to docs.bittensor.com.

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