

Bittensor

The internet of machine intelligence

An educational primer on the Bittensor network: what it is, how it works, why decentralised machine intelligence matters against a consolidating AI industry, and how to judge it on its own terms.

— IMPORTANT INFORMATION

Please read this first.

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— HOW TO READ THIS PRIMER

Written for any reader. No prior crypto or AI knowledge assumed.

This is an educational explainer about the Bittensor protocol. Terms are defined as they appear, plain-English translations accompany the mechanics, and a glossary closes the deck.

WHAT IT IS

A structural and technical overview of Bittensor: how the network works, what TAO is, and how to evaluate the protocol on its own terms, whether this is your first encounter with crypto or your fiftieth.

WHAT IT IS NOT

A recommendation to buy any cryptoasset, a description of any xTensor product or fund, or a forecast of the price or returns of TAO or any subnet token.

HOW IT IS BUILT

Every quantitative claim is dated and sourced. Open questions are flagged as open. Risks are addressed prominently, in their own section, on their own merits.

WHY NOW

Machine intelligence is consolidating.

Frontier AI is produced and distributed by a small number of private laboratories. Model weights, training data, compute, and customer relationships are concentrated by design, and each new training run raises the capital bar for entry. Intelligence is becoming an input to nearly every decision; the structure of its supply is being set now.

WEIGHTS

Frontier model weights are closed. Users rent access; they cannot inspect, modify, or own it.

DATA

Training corpora and evaluation pipelines are proprietary and undisclosed.

COMPUTE

Access to frontier-scale compute is gated by capital and vendor allocation.

DISTRIBUTION

A few platforms decide how intelligence reaches users, and at what price.

This is a coherent commercial structure. It is not the only possible one.

FROM THE HEADLINES · Q2 2026

Single points of control are no longer theoretical.

12 JUN 2026 · MODEL ACCESS

Anthropic suspends Claude Fable 5 and Mythos 5 worldwide under a US export-control directive.

One directive switched off a frontier model for every customer on earth, overnight. Access was restored weeks later.

Anthropic statement; Malwarebytes, Jun 2026

25 JUN 2026 · MODEL ACCESS

OpenAI restricts GPT-5.6 to roughly 20 government-approved organisations after a White House request.

A June 2026 executive order now routes powerful model releases through pre-release government review.

TechCrunch; CNN Business, Jun 2026

Q1 2026 · INFRASTRUCTURE

More than 75 US data-centre projects worth about \$130B blocked or stalled amid bipartisan opposition.

Roughly half of the AI data-centre capacity announced for 2026 is delayed or cancelled; power is the binding constraint.

Tom's Hardware; Data Center Watch; SemiAnalysis

MAY 2026 · INFRASTRUCTURE

At least 69 US local governments enact data-centre bans; Seattle passes a one-year pause.

Centralised AI needs concentrated land, water, and power, which makes it visible, and political.

Grist, May 2026

These are not judgments on the merits of each decision. They illustrate a structural fact: centralised AI has single points of control, and in 2026 those points are being used.

— THE STRUCTURAL COMPARISON

Centralised and decentralised AI answer the same questions differently.

	CLOSED LAB	OPEN NETWORK
PRODUCTION	A single firm hires the researchers and buys the compute.	Anyone able to do the work can join, and is paid by protocol rules.
ACCESS	Gated by commercial terms, geography, platform policy, and, increasingly, government directive.	Permissionless: any user, any country, any hour.
PRICING	Set by the vendor, against its own margins.	Set by open competition between many suppliers.
OWNERSHIP	Concentrated in the lab's shareholders.	Distributed among those who build, secure, and use the network.
RESILIENCE	A single corporate, political, or technical point of failure.	No single operator to fail, capture, or switch off.
TRADE-OFF	Coherent roadmap, deep capital, the strongest products today.	Coordination is harder; quality and paying demand must be proven.

The final row is deliberate: the open model's advantages are structural, not automatic. Sections IV to VI examine whether they are being realised.

— THE CASE FOR OPEN NETWORKS

Why decentralisation matters more than ever.

01

Resilience

Infrastructure without a single owner cannot be revoked, repriced, or repurposed by one boardroom or one government.

02

Open participation

Talent and hardware anywhere in the world can contribute and be paid at protocol speed. No permission, no employment contract.

03

Price competition

Open supply competes on cost per unit of useful output. Closed vendors price against their own margins.

04

Aligned ownership

The people who build, secure, and use the network can own it: the economics of the internet's open layers, applied to AI.

The precedent. Open systems have won before: TCP/IP outlasted proprietary networks, and Linux runs most of the world's servers. Open-weight models now trail frontier labs by months, not years. The open question is whether open networks can also win the economics of AI: producing, pricing, and paying for intelligence.

— AN EARLY MARKET

In centralised AI, most value is already priced. In decentralised AI, most of it is still unbuilt.

THE CAPABILITY LAYER EXISTS

Live networks, Bittensor foremost, already coordinate real inference, training, compute, and storage across independent operators worldwide.

THE COMMERCIAL LAYER IS EARLY

Products, distribution, and paying demand are still being built. That gap between working infrastructure and commercial maturity is where companies get formed, and where this cycle's value creation is concentrated.

THE REPRICING IS UNFINISHED

Leading closed labs have been valued in the hundreds of billions of dollars in private markets. The entire Bittensor ecosystem, TAO plus every subnet token, is valued at roughly \$3.5B (30 June 2026). Whether that gap reflects mispricing or unproven demand is the central question this primer equips you to track.

These are structural observations, not a forecast. Early markets fail as often as they compound. Section VI sets out the risks with equal weight.

— DEFINITION

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

- ◆ **Subnets** Specialised on-chain markets. Each defines a task (inference, training, compute, storage) and the rule by which work is scored.
- ◆ **Miners** Compete to produce the work: models, responses, agents, compute, data.
- ◆ **Validators** Score miner outputs; the protocol aggregates their judgments into a consensus ranking.
- ◆ **TAO** The network's native asset, issued on a fixed schedule by protocol rules and routed to participants judged useful.

In plain terms: think of Bittensor as a system of open competitions. Each subnet is a competition with its own task and scoring rule; TAO is the prize money, minted on a fixed schedule and paid to whoever the judges collectively rank as most useful.

— THE PROTOCOL LINEAGE

Three open protocols. Three freed resources.

1983

Internet

INFORMATION PROTOCOL

Open rules for moving information between any two machines. No owner, no gatekeeper; it outcompeted every closed network.

2009

Bitcoin

FREE MONEY PROTOCOL

Open rules for holding and moving value without banks. Scarcity and settlement enforced by mathematics, not institutions.

2021

Bittensor

INTELLIGENCE PROTOCOL

Open rules for producing and pricing machine intelligence. Useful work, judged and paid by the network itself.

Each time, an open protocol turned a controlled resource into a public market: information, then money, now intelligence.

— ORGANISING PRIMITIVE

Three ways human work has 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.

THE OPERATING LOOP

Three roles. One cycle. Repeated continuously.

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

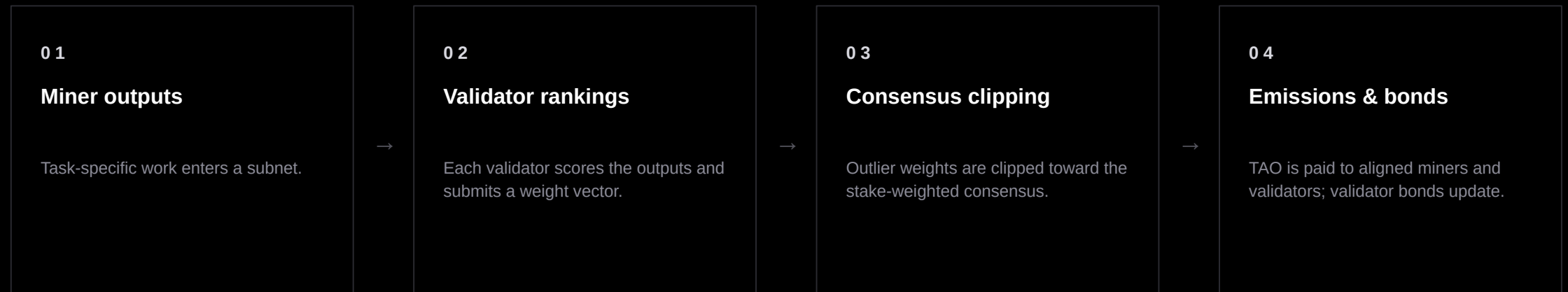
Rank the outputs.

Run the scoring rule and submit rankings. The protocol aggregates them into a stake-weighted consensus.

Every cycle, rewards follow scored performance, so capital, talent, and compute keep moving toward whatever the network's judges find most useful.

— YUMA CONSENSUS

How the protocol turns validator disagreement into payment weights.



WHY THIS IS POWERFUL

Yuma Consensus lets thousands of strangers agree on the quality of work without trusting each other. Honest scoring is the profitable strategy: validators earn most when their rankings match the eventual consensus, and outliers lose influence and income. A subjective question, “is this output good?”, becomes an objective, payable number, block after block.

DYNAMIC TAO & EMISSIONS

Capital allocation between subnets is a live market.

◆ Allocation

Stakers lock TAO into a subnet's pool and receive that subnet's alpha token in return. Each pool is an automated market maker.

◆ Signal

Each alpha price reflects live demand for that subnet's specific work. Price discovery runs continuously, per subnet.

◆ Routing

Each subnet's share of newly minted TAO is set by protocol rule from these market signals (current rule at right).

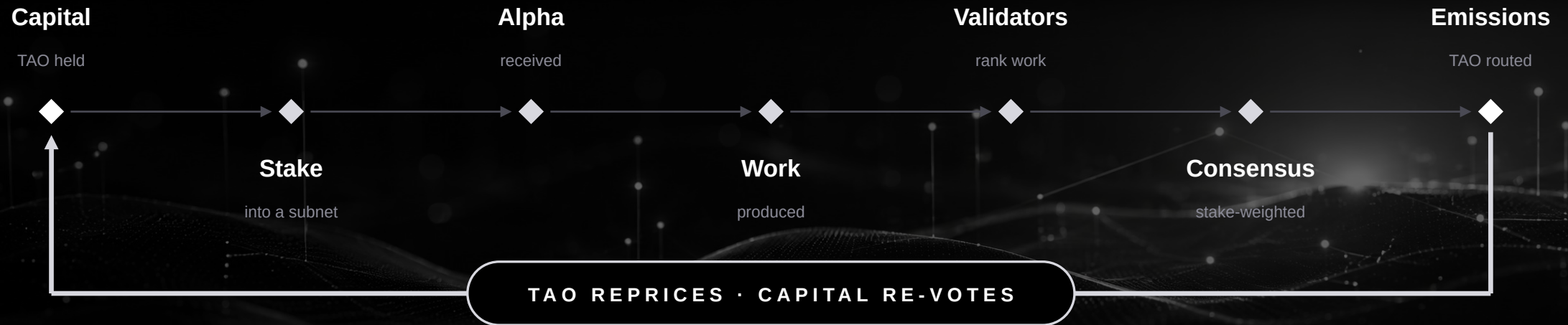
WHY A LIVE MARKET MATTERS

- ◆ No committee, no grant panel. Capital votes continuously, and every vote has a price attached.
- ◆ Winners compound: subnets that attract stake receive more emissions, which attracts better miners and better output.
- ◆ Losers shrink automatically: capital leaves, emissions follow, and the protocol recycles the slot for a new team.
- ◆ Anyone can disagree with the market at any time, by staking against it.

In plain terms: subnets the market values more receive more of each day's new TAO. It works like a stock market for machine-intelligence markets, repricing every block.

— THE WHOLE LOOP, IN ONE PICTURE

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



Emissions move prices. New prices direct the next round of capital. The loop never stops.

No committee decides which subnet deserves capital. Prices do, block by block, in the open.

— SUBNETS IN PRACTICE

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

Inference

Chutes · Targon

Serve model outputs to external clients through OpenAI-compatible APIs.

Training

IOTA (Macrocosmos)

Orchestrated pretraining of large models across distributed, heterogeneous GPUs.

Vision

Score (SN44)

Decentralised computer vision; miners compete to train and serve vision agents.

Compute

Lium · Targon

Permissionless GPU marketplaces; H100/H200-class supply priced in TAO.

Storage

Hippius

Object storage with on-chain proofs of retrievability.

Specialty

Forecasting · agents · coding

A long tail of narrow markets; a few will define new categories.

128 subnet slots: scarce, competitive real estate. Weak subnets are deregistered and their slots recycled for new teams.

— SIGNALS OF EXTERNAL DEMAND

The right question for any decentralised network: who is paying for the output, and how do we know?

COMPUTE	Targon × Intel March 2026: joint Intel and Manifold Labs whitepaper on confidential compute (Intel TDX) for decentralised AI. Targon operates 1,500+ H200 GPUs and raised a \$10.5M Series A.
ENTERPRISE	Score × PwC April 2026: PwC France & Maghreb allied with Manako Labs to deploy enterprise vision AI on Score (SN44). The first Big Four adoption of Bittensor infrastructure.
INFERENCE	Chutes (SN64) Publishes per-model request volumes; external API keys account for a measurable share of traffic.

WHAT TO LOOK FOR

- ◆ External API traffic, where published.
- ◆ Named enterprise partnerships with delivery commitments.
- ◆ Off-network deployment of subnet weights and datasets.
- ◆ Subnet revenue versus daily emissions: the breakeven test.

Paying external demand is the strongest signal that the protocol produces something the world values.

— A TECHNICAL REFERENCE POINT

Orion-100B: hundred-billion-parameter training, without a datacenter.

A 2026 distributed training run by Macrocosmos on IOTA (Subnet 9), coordinating geographically distributed GPUs into a single pretraining pipeline.

100B

PARAMETERS

Scaled from 1.5B to 100B within roughly a month, validated through 750+ experiments.

~65%

OF DATACENTER SPEED

Relative to comparable centralised deployments, with 30%+ model FLOP utilisation.

16

PIPELINE STAGES

Across three replicas of distributed NVIDIA A100 GPUs, with fault-tolerant networking.

Why it matters: training at this scale was assumed to require a single facility. Orion-100B is evidence that incentive-coordinated, distributed hardware can now approach datacenter economics on the hardest workload in AI.

— TOKEN ECONOMICS

Bitcoin-style monetary design. Intelligence-market destination.

21M

HARD CAP

Same fixed terminal supply as Bitcoin.

0%

PREMINE

Fair launch. No foundation or insider allocation.

~3,600

TAO PER DAY

Emission rate since the first halving, 12 December 2025 (from 7,200).

~70%

STAKED

Share of supply staked, driving subnet allocation.

Participation is open: any TAO holder can delegate stake to a validator and earn a share of that validator's emissions. No hardware required.

Halvings continue on a Bitcoin-like schedule until the 21M cap is reached.

— MARKET CONTEXT

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

~\$2.0B

TAO MARKET CAP

30 June 2026.

~\$209

TAO PRICE

30 June 2026.

~11.1M

CIRCULATING TAO

Of the 21M hard cap.

128

SUBNET SLOTS

Fixed today; weak subnets are recycled.

WHAT IT IS

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

WHAT IT IS NOT

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

— THE RESERVE ASSET

Every road into the ecosystem runs through TAO.

**THE ONLY DOOR**

Subnet alpha tokens can only be acquired with TAO. Any capital seeking exposure to any subnet must buy TAO first, whichever subnet it is chasing.

THE SINK

Staked TAO sits locked in subnet pools while held, thinning the tradable float. A breakout subnet absorbs TAO on the way in.

THE INDEX PROPERTY

Holding TAO is exposure to capital flowing toward any subnet that succeeds. Holding a specific alpha token is a concentrated bet on one.

The honest caveat: the sink is reversible. TAO locked by staking is released by unstaking, and the same mechanics amplify outflows. This is a design property, not a guarantee of price.

— INSTITUTIONAL VALIDATION

Institutional capital has started to arrive.

SUBNET FUNDS

DCG-backed Yuma launched its Total Market Fund in June 2026: a single institutional vehicle tracking TAO plus a basket of subnet tokens, seeded by an anchor investor.

LISTED TREASURIES

Digital-asset treasury companies are accumulating TAO on public markets: Nasdaq-listed TAO Synergies holds 54,000+ TAO as a pure-play treasury, and Synaptogenix adopted TAO as a reserve asset.

LIQUID FUNDS

Dedicated liquid vehicles are deploying in the ecosystem: Polychain reportedly added roughly \$200M of TAO exposure in Q1 2026, and digital-asset hedge funds now trade TAO and subnet tokens directly.

ETF PIPELINE

Grayscale runs the GTAO trust and, together with Bitwise, has filed for spot TAO ETFs, with first approvals anticipated by some reports as early as late 2026.

Read this with care. Investment capital is currently ahead of usage revenue: institutions are underwriting the network's future, not its present income. Whether usage catches up to capital is the central question of Section VI.

— RISK REGISTER

Bittensor is an early-stage network. These items are material.

01 Output-quality gap Many subnets still lag frontier closed models on quality.	02 Productisation gap The protocol outpaces its interfaces, distribution, and brand.	03 Volatility TAO has repeatedly drawn down 60%+ from prior highs.	04 Subnet selection Most subnets will fail; dispersion between them is extreme.
05 Mechanism churn Core emission rules changed three times in 18 months; parameters can move against any position.	06 Regulatory uncertainty The treatment of TAO and alpha tokens remains unsettled across jurisdictions.	07 Validator concentration Small validator sets can collude or be captured.	08 Scale & governance Consensus and on-chain governance remain young and largely core-team-led.

A reader persuaded by the thesis should still expect several of these risks to bite. Weigh them on their own merits.

WHAT TO WATCH

Four falsifiable questions to track over the next six to twelve months.

Each is independently verifiable through public Bittensor data and third-party sources. No trust in this document required.

Q 1

Does subnet output find paying external demand?

Inference traffic and payments from non-network addresses; enterprise partnerships that convert to delivery.

Q 2

Does the capability frontier keep moving?

Training-run scale beyond Orion-100B; independent benchmark scores for subnet models.

Q 3

Does the Bittensor chain governance stabilise?

Recent rule changes were rapid and arguably necessary, but a sustained period of stability is what institutional capital will need. Track the frequency of protocol changes.

Q 4

Does regulatory treatment clarify?

FCA, SEC, and MiCA guidance on TAO and alpha-token classification.

Positive answers strengthen the open-network case. Negative answers should update it. Either way, the data is public.

— TAKEAWAY

Carry this page away.

DEFINITION

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

WHY IT MATTERS

AI is consolidating into a few closed labs, and 2026 has shown those labs can be switched off, restricted, and blocked. Bittensor is the most developed live counterweight: open production, open pricing, open ownership, with most of its commercial layer still to be built.

STATE OF THE NETWORK

21M TAO hard cap · first halving December 2025 · ~70% staked · ~\$2.0B TAO market cap · 128 subnet slots · Orion-100B distributed training · Intel and PwC engagements. (30 June 2026)

RISKS & WATCHPOINTS

Output quality · productisation · volatility · subnet dispersion · mechanism churn · regulation · validator concentration. Watch: paying demand, capability, governance stability, regulatory clarity.

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

— GLOSSARY

Eight terms used throughout this primer.

Subnet

A specialised on-chain market: its owner sets the task and the scoring rule.

Validator

Scores miner outputs and submits weight vectors to the protocol.

Alpha token

Subnet-specific token minted when TAO is staked into that subnet's pool.

Yuma Consensus

Aggregates validator weights into a stake-weighted ranking; clips outliers.

Miner

Submits outputs (models, responses, agents, compute, data) into a subnet.

TAO

Native cryptoasset of Bittensor, used for staking, fees, and emissions.

Dynamic TAO (dTAO)

The system of per-subnet pools and market signals that routes emissions between subnets.

Emission

Newly minted TAO paid each block to subnet owners, miners, and validators.

SOURCES

External references used throughout this primer.

Slides 4, 6–8	Public disclosures of frontier AI laboratories; CoinGecko / CoinMarketCap market data, 30 June 2026; xTensor structural synthesis.	Slide 5	Anthropic statement on the Fable 5 / Mythos 5 suspension (12 Jun 2026); TechCrunch and CNN Business on GPT-5.6 restrictions (Jun 2026); Tom's Hardware, Data Center Watch, SemiAnalysis and Grist on US data-centre cancellations and bans (Q1–May 2026).
Slides 9–12	Bittensor documentation (docs.learnbittensor.org): protocol overview; subnets, miners, validators.	Slide 13	Bittensor documentation: Yuma Consensus.
Slides 14–15	Bittensor emissions and Dynamic TAO documentation (docs.learnbittensor.org, last edited 25 Jun 2026).	Slide 16	Subnet directories and operator materials; Bittensor documentation on subnet registration and deregistration.
Slide 17	Intel / Manifold Labs confidential-compute whitepaper (23 Mar 2026); PwC France & Maghreb / Manako Labs alliance (Apr 2026); Chutes operator dashboard.	Slide 18	Macrocosmos Orion-100B announcement; IOTA technical primer (arXiv, 2026); tao.media coverage.
Slides 19–20	CoinGecko / CoinMarketCap TAO market data, 30 June 2026; public reporting on the 12 December 2025 halving.	Slide 21	Bittensor and Taostats subnet-pool documentation (constant-product pools; alpha purchasable only with TAO).
Slide 22	Public reporting and SEC filings (Grayscale GTAO S-1/A) on institutional TAO holdings: Nvidia, Polychain, Grayscale, Bitwise. June 2026.	Slide 23	Public market data; Bittensor documentation; xTensor risk framing.

Where a Bittensor documentation page is cited, the reader is referred to docs.learnbittensor.org.

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