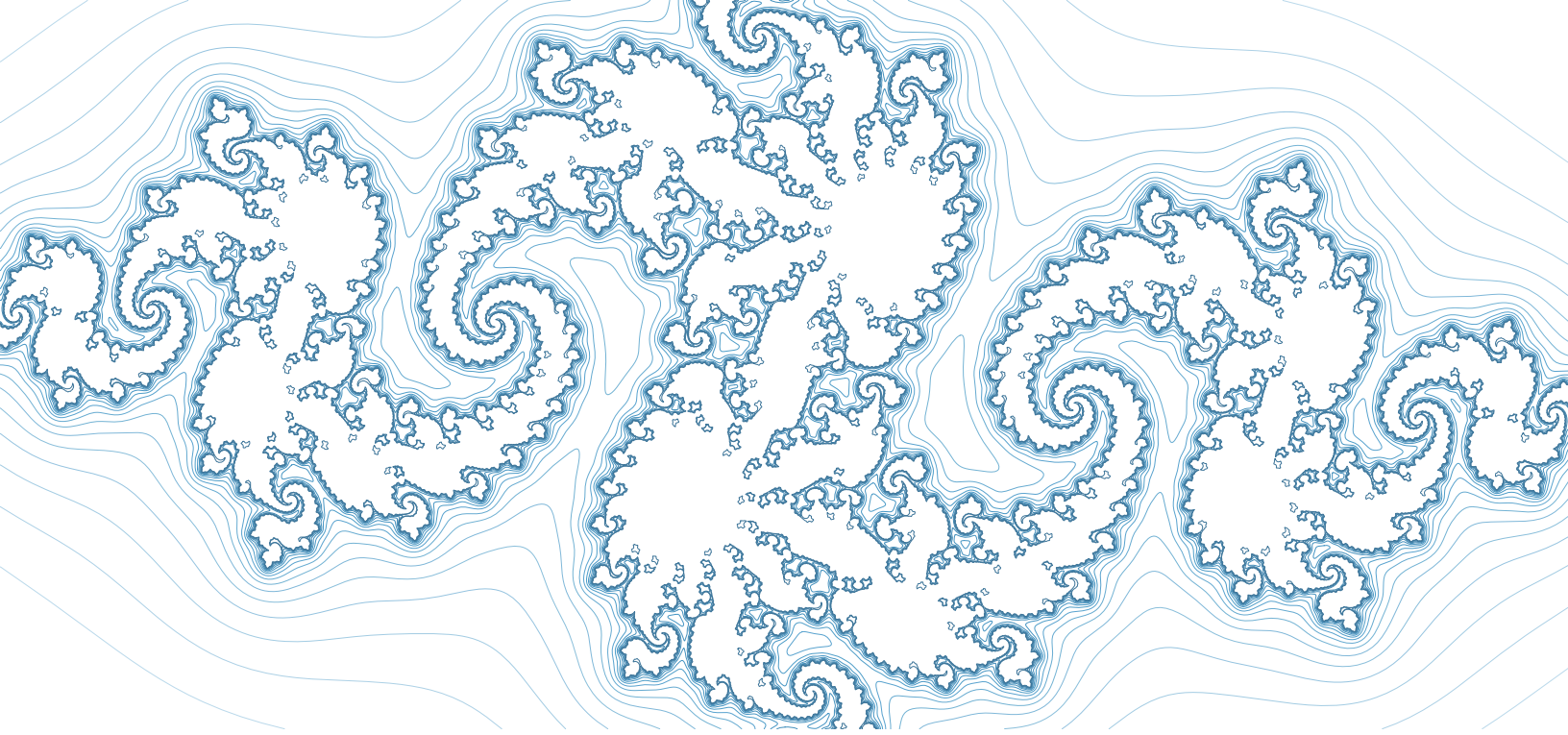


Akash Compute Forwards

A cleared forward market in GPU compute

Overclock Labs

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Abstract

A GPU-hour is perishable: an hour that is not served in its hour is gone. A provider that buys GPU servers and a buyer that plans months of work both need to fix the price of hours that do not yet exist, yet the Akash lease market sells compute only for prompt delivery, and a private contract fixes a price only by tying each side to the other's solvency. We propose a forward market in which a contract is one node of one GPU grade, in one region, for one calendar month. An on-chain program on Solana stands between every buyer and seller. Each day it clears an open auction, values every position at a price built from the market's own trades, and moves the day's gains and losses between accounts in US dollars, so a loss that has been paid cannot be walked away from. Before each month it pairs buyers with providers' attested nodes, and validators probe every lease each hour. Anonymous accounts post the full value of their positions. Certified accounts post less, because an underwriter's capital, a default fund and a legal claim stand behind them. Every protection has a limit published in advance, and the fund never pays for an anonymous account.

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1 Introduction

A GPU-hour, one hour of one graphics processing unit, is perishable. An hour that is not served in its hour is gone, like a seat on a flight that has left. A provider pays for its servers up front and recovers the cost one rented hour at a time, so it is exposed to a fall in the price of compute. A buyer that plans months of training or inference needs a known number of machines at a known price, so it is exposed to a rise. The capital at stake is large: NVIDIA alone reported data-centre revenue of 115.2 billion US dollars for its fiscal year 2025 [1].

On Akash today, compute trades in the lease market. A tenant posts a deployment, providers bid for it, and the tenant leases from one of them. That market sells compute for prompt delivery, with no standard grade and no quoted price, so nobody can use it to fix the price of a month that has not begun.

A private contract can fix a price, but only by adding a counterparty. The buyer then depends on the provider to keep serving after compute has become dearer, and the provider depends on the buyer to keep paying after it has become cheaper. Such a contract is negotiated alone, its price is seen by nobody else, and neither side can leave it without the other's consent.

We propose a forward market in GPU compute. A forward is a contract, agreed today, to deliver at a fixed price at a later date. Here a contract is one node of one GPU grade in one region for one calendar month, and an on-chain program on Solana stands between every buyer and seller. Each day the program clears an open auction, values every position at a price built from the market's own trades, and moves the day's gains and losses between accounts in dollars. A day before each month begins, it pairs each buyer with a provider's attested nodes, servers whose hardware the validators have verified, under a one-month lease.

Two tiers of account share the market. An anonymous account can be any wallet, and it posts the full value of its position. A certified account has a legal identity behind it, scored by a certification agent that underwrites part of its margin. Behind it stand the agent's capital and a default fund, each with a stated limit. We call the program and its markets the venue. The venue has no token of its own, keeps its accounts in US dollars (USD) and settles them today in USDC, the dollar stablecoin that Circle issues.

We follow one trade throughout, taken from the design's worked examples. A provider sells, and a buyer buys, one node of the H100A grade, which has eight GPUs, for six consecutive months at 2.00 USD per GPU-hour. At 730 hours in an average month, the trade covers 35,040 GPU-hours and is worth 70,080 USD. The price is an illustration, not a forecast. Figure 1 shows the whole system.

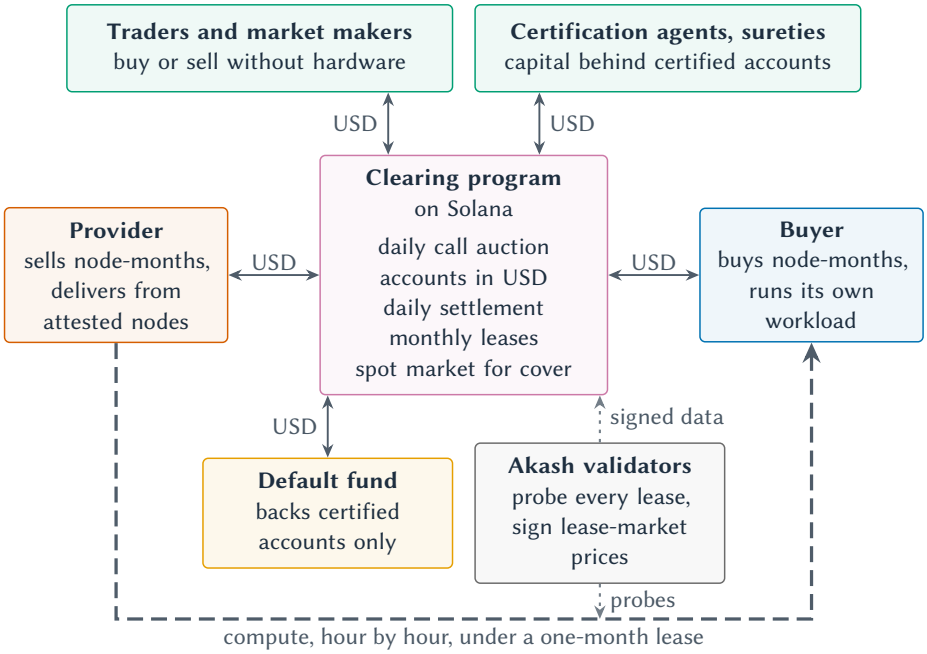


Figure 1. All margin, settlement and payment for compute passes through the clearing program, while compute flows directly from the provider's node to the buyer. Solid arrows carry dollars. The dashed arrow carries compute under a one-month lease. Dotted arrows carry the validators' signed probes and lease-market prices. The default fund backs certified accounts only.

2 Forward Markets

A forward fixes a price for later delivery. The buyer is long and gains when the price at delivery is above the contract price. The seller is short and gains when it is below. What one side gains the other loses, as Figure 2 shows for the running example.

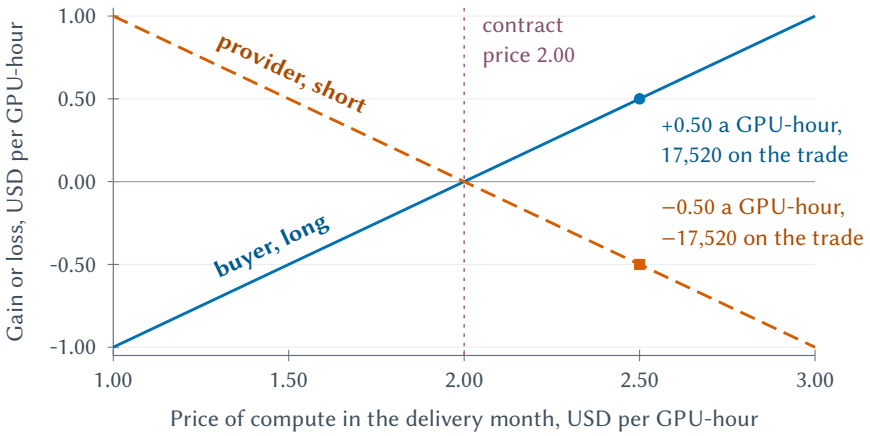


Figure 2. A forward fixes the price: above 2.00 the buyer gains what the provider gives up, and below it the reverse. Gain or loss per GPU-hour on the running example's contract, against the price of compute in the delivery month. On the trade's 35,040 GPU-hours, each 0.10 move is 3,504 USD.

A long forward behaves like a long position on a perpetuals exchange opened at the contract price, with three differences. It ends on a fixed date. It needs no funding payments, because delivery ties its price to the price of compute at the end. And at the end the buyer receives compute rather than cash against an index.

The forward is a hedge. A provider that sells its next six months knows its revenue whatever the price does, and a buyer that buys them knows its cost. Each gives up the gain it might have made in return for protection from the move that would have hurt it.

A forward between two named parties leaves each exposed to the other. In 1865 the Chicago Board of Trade formalised grain trading with standardised agreements called futures contracts [2], and exchanges later put a clearinghouse between buyer and seller. The clearinghouse is the buyer to every seller and the seller to every buyer. It holds margin from both, and each day it moves the day's losses from losers to winners, so that no loss builds up unpaid.

Electricity is the closer precedent. Power cannot be stored, is delivered continuously and is sold forward in monthly blocks. Compute shares those traits: nothing can be delivered late, and settlement must follow the hourly clock of delivery. Compute differs in two ways. Its quality cannot be seen from outside, so the market must verify each node and check each hour of service. And it has no standard grade or quoted forward price, so the market must define its grades and build its own reference price.

3 The Contract

We define a node-month as one node of one grade in one region for every hour of one calendar month. It is the contract. Any attested node of that grade and region delivers it, so every node-month of a contract is exchangeable for any other, positions net, and one price serves the whole contract. Prices are quoted in USD per GPU-hour, so an hour of an eight-GPU node costs eight times the quoted price.

> **Key idea**
>
> A contract is one node of one grade, in one region, for one calendar month. Any attested node of that grade and region delivers it, so contracts are interchangeable and trade at one price.

A grade is defined by thresholds a machine can check, and every grade requires confidential computing, a hardware mode in which a node encrypts a workload's memory and signs a report of what it runs. H100A is eight H100 GPUs of 80 GB, with fixed minimums for interconnect, compute, memory, storage and network. B300A is eight B300 GPUs, whose floors are read by formula from benchmarks of its first attested nodes and re-read each quarter. The three regions, NA, EU and APAC, are coarse because they are the only geographic information on chain.

A position is a net number of nodes, positive for a long that will receive compute and negative for a short that will deliver it. Anyone may be long or short, because attestation is required to deliver, not to sell. A market maker can therefore sell without hardware and buy back before the month. Any party exits by trading the other side at a close before the delivery month, with no counterparty's consent.

A strip, a run of consecutive months such as the running example, is entered as a block order that fills in every month or in none. A buyer that wants a single hour, or a lease with no fixed end, uses the venue's spot market for compute delivered within the hour. Figure 3 shows the life of a contract.

The venue opens with a pilot in which only certified accounts may place orders. Governance ends the pilot behind its timelock and veto, and it cannot restart it. The anonymous tier then opens, and an anonymous trader may use a fresh key for every order.

4 The Auction

Each contract has an open book of resting limit orders, shown as total size at each price with no keys. The program also publishes the price at which

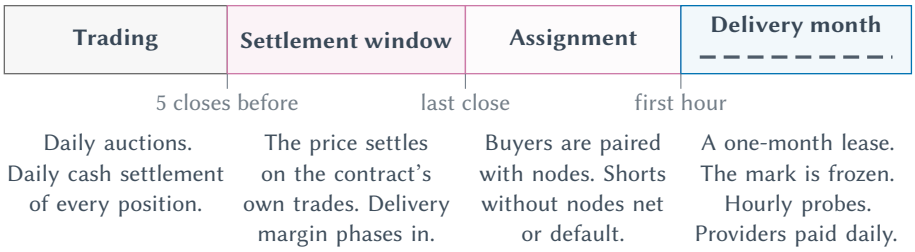


Figure 3. A contract trades until a day before its month, its price settles over its last five closes, and it is then delivered hour by hour. The life of one node-month at initial values. Positions settle in cash every day throughout, and providers are paid daily for served hours.

the book would clear now and the size that would be left unmatched. Once a day it clears every contract in a call auction: the keeper, a validator on duty, finds the one price that matches the most volume, and every fill trades at that price. Orders at the marginal price share the fill pro rata, so a trader dealing with itself cannot be sure of filling only against itself.

The close falls at a random moment in a ten-minute window, seeded by the drand public randomness beacon [3], so nobody can act on the indicative price at the last instant. A jump of more than 10% in the last fifteen minutes extends the close by five minutes, at most twice. The program never matches orders from the same key, or from two keys of one certified owner. These timings are initial values.

A block order spans several months with one limit on their average price. Flags let a buyer ask to stay on its current nodes or to take cash at assignment.

Under one clearing price a bid's limit buys no priority, so nobody gains by overbidding. An order that rested through an earlier close pays the maker fee of 1 basis point of matched notional. Any other fill, including an order re-priced since the last close, pays the taker fee of 5 basis points. On the running example's strip the taker fee is 35.04 USD.

5 The Mark

The mark is the price at which the program values a position each day. The venue's own clearing prices, its prints, are its only source. After each close the program builds a curve for each grade and region, with one point per delivery month. A month whose latest close traded at least its usual daily volume takes that day's price. A thinner month, and every month until its volume first passes a seeded floor, takes the average of its recent prices with the highest and lowest dropped.

A second price, the anchor, measures what replacement compute costs now. It blends a lease leg, the price of leases open and paying on the Akash

lease market for the grade and region, with a venue leg, the average price of the nearest month still trading. Each selected validator reads and signs the lease leg, and the program takes the median. Each leg is weighted by how precisely it is measured, so a provider counts once in the lease leg however many nodes it leases, and the venue leg gains weight only with traded volume. The anchor never sets a contract's price, but it can confirm a move that the venue printed.

No fixed daily limit bounds the mark. Each point has a band, a multiple of its measured volatility, and a move inside the band is admitted at once. A move beyond it is admitted in full only when it is precisely measured and either both legs of the anchor moved beyond the band the same way or the next close prints again, on full volume, within one band of the first print. Otherwise the point moves to the band's edge and the rest waits, as Figure 4 shows. Volume alone never admits such a move, and the band can at most double from one close to the next.

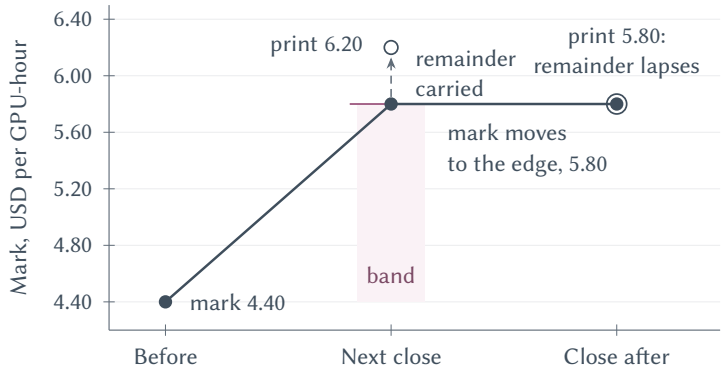


Figure 4. A print beyond the band moves the mark only to the band's edge, and the rest moves only if the next close confirms it. Months four to six of the running example, marked at 4.40. The next close prints 6.20, and the mark moves to the band's edge at 5.80. The close after prints 5.80, the market having not kept 6.20, so the remainder lapses.

A contract's last five closes before its month form its settlement window, at the initial value. Its settlement price is the average of the window's daily points with the highest and lowest dropped, and its mark freezes there for the delivery month. A thin window is blended toward the anchor. Cash settlements in delivery and at assignment are made at the anchor's average over the last few closes, so that no single close can set them.

The statistics behind the mark and the margin start from values seeded from transacted price history, never from posted list prices, and the venue's own data replaces them. The venue's spot market is not a price source. If it were, bids of about 180 USD a day in thin hours could move delivery margins, the covered price and the fund's target by 47%, as a thin price feed was pushed on Mango Markets in October 2022 [4].

> **Key idea**
>
> The venue's own trades set its prices. An outside reading can confirm a move but never make one, and a move that the market does not repeat waits.

6 Margin and Settlement

Margin is a deposit that secures performance. Unlike collateral in a lending protocol, which secures a loan already made, it secures losses not yet incurred, and the program pays those losses out of it in cash every day.

Each day the program moves the change in value of every position between accounts. For a position of q nodes, the day's transfer, its variation margin, is

$$V = (M_t - M_{t-1}) \times g \times H_{\text{rem}} \times q, \tag{1}$$

where M_t and M_{t-1} are today's and yesterday's marks in USD per GPU-hour, g is the number of GPUs per node, H_{rem} is the hours not yet delivered, and q is positive for a long and negative for a short. Losers pay and winners are paid, and the loser is never asked. A loss already paid cannot be avoided by walking away. In the running example, a rise of 0.10 in the curve moves 3,504 USD from the provider to the buyer. Because a position's mark starts at its trade price, each side nets its contract price on every hour delivered.

A day's gain counts toward margin at once, but it cannot be withdrawn for one close-out window. We define the close-out window W as the days from a margin breach to the first fill of the order that closes the position out, read at a high percentile of the venue's record and seeded at four days. A gain on a price that the market does not keep is taken back before it can leave. A settlement is flagged on one of three measured warning signs, such as a close with a wide spread or a move beyond the band that reverses within the window, and the gains it paid wait a second window.

An anonymous account posts the full notional, the contract price times the position's GPU-hours, on either side. A buyer's deposit is both its margin and the prepayment of its hours, so it can never owe more. A seller's deposit covers a doubling of the price at trade, and the seller must always hold at least one window of stress on its remaining hours, the stress rate S times their value at the mark. S is a high quantile of the price move over one window, measured from data, and our examples use 30%. A seller below that floor has 24 hours to top up, and a position too large to unwind within one window must hold more.

In the running example each anonymous side posts 70,080 USD. If the curve reaches 3.00 by the end of month two, the provider holds 46,720

against a floor of 21,024. At a 30% stress, a seller that never withdraws reaches its floor at about 1.54 times its contract price.

A certified account posts a risk-based requirement, a rate times the position's value at the mark, built on the base rate

$$r = z \times \sigma \times \sqrt{W}, \tag{2}$$

where z is the 99.5% quantile of the normal distribution, 2.58 at the initial confidence level, σ is the contract's measured daily volatility and W is the close-out window in days. At a seeded σ of 2% and a W of four days, r is 10.32%. Floors drawn from the grade's long-run and recent worst volatility keep the rate from shrinking in a calm market. The rate may rise by at most a quarter from one close to the next, so a stress day calls the day's loss and only part of the higher requirement. A position too large to unwind in one window posts more.

Certification buys an unsecured allowance, the part of the base requirement that a legal claim is trusted to collect. At the initial values it rises from nothing at a score of 400 to 30% at 1,000, and it shrinks when the default fund is below its target. At a score of 700 it is 15%, so the running example's certified buyer posts 7,232 less 1,085, or 6,147 USD, about 8.8% of notional. The allowance never touches the day's settlement, which is always paid in cash.

Three add-ons are posted in full, with no allowance: the position's loss at the worst mark of the last window, the gap between the mark and the anchor near and during delivery, and one day of payments for a buyer in delivery. A certified account's floor is its base requirement less the allowance, plus 80% of the add-ons at the initial value. An account below its floor has 24 hours to top up before the program closes it out by liquidating its positions. In its delivery month a certified position must also hold at least one window of stress on the frozen value of its remaining hours, 30% at a 30% stress, phased in over the last five closes. Section 11 explains why.

Figure 5 follows the certified buyer through a fall. On the first day the curve falls 15% to 1.70, and the buyer owes 10,512 USD, more than it posted. It pays its 6,147, the default fund fronts the other 4,365 so that the day's winners are paid in full, and grace begins. The next day the curve falls 10% more to 1.53, and the program closes the position out.

> **Key idea**
>
> Losses are paid in cash every day, from the loser's margin, before they can grow. Gains wait one close-out window before they can leave the venue.

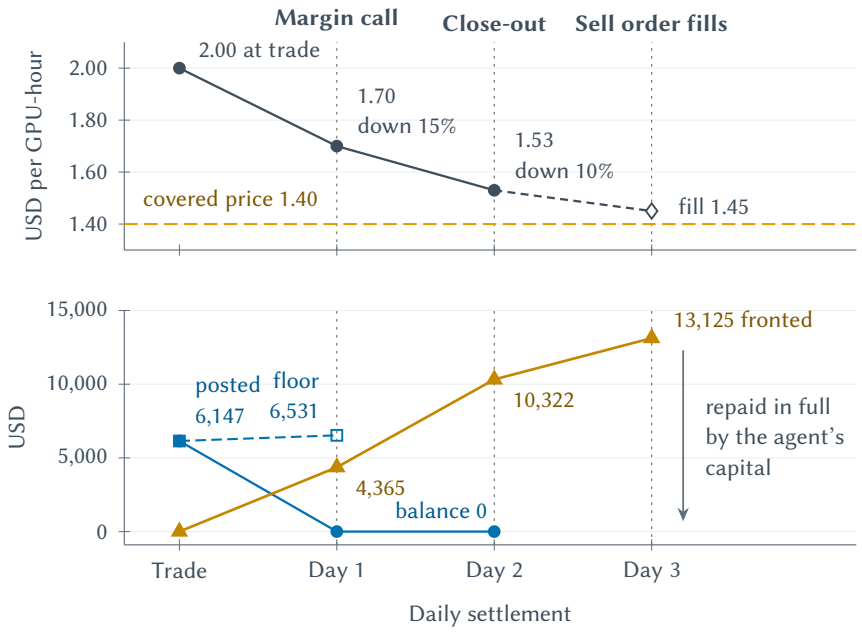


Figure 5. When the buyer's margin ran out, it had one day's grace and was closed out on the second, while its counterparties were paid in full every day. The certified buyer of the running example, at a score of 700, through a fall of 15% and then 10%. The default fund fronted what the buyer could not pay, and the certification agent's capital repaid all of it. An illustration at initial values, not a forecast.

7 Certified Credit

A certification agent is the venue's know-your-business and know-your-customer authority and the underwriter of its certified credit. Governance registers each agent, which posts a conduct bond in dollars and may not also be a validator or a provider. The agent verifies a participant's legal existence, signing authority, domicile and attachable assets. It then scores the participant's recoverability from 0 to 1,000, an estimate of what a legal claim against the owner would collect.

The allowance is credit that the agent extends. Each day the program charges the account the agent's annual rate on its allowance and pays it to the agent. A floor on the rate, set from the venue's measured losses by score, stops an agent from buying business with cheap credit. A certified trader thus pays a credit premium to its agent and a guarantee premium, a daily charge for the fund's cover, to the default fund. It may move to another agent at any time unless a claim against it is open.

Each agent holds a stratum, its own dollars held by the program, which pays before the default fund on any account the agent certified. An agent with no record holds a dollar of stratum for every dollar of allowance it grants, so the fund carries none of a new agent's credit risk. As its scores

prove accurate over years of credit outstanding, its requirement falls toward the share of credit measured to default in a bad month. On a position opened within the last window, the stratum answers for the whole loss, because an account that buys at a peak and defaults on the reversal inside one window is what a shell looks like.

The stratum plays part of the role that a clearing member plays at a futures exchange, standing between its customers' defaults and the shared fund, but it answers only for the credit it extended and for fresh positions. Figure 6 shows how a certified requirement is met.

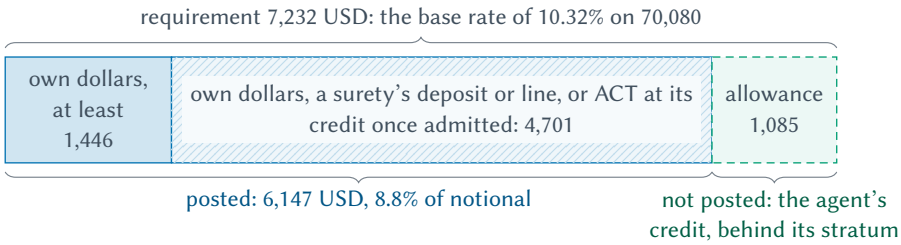


Figure 6. Certification turns part of the requirement into the agent's credit, and the account's own dollars must cover at least a fifth of it. The running example's certified buyer at trade, at a score of 700, with widths to scale. Add-ons and the in-delivery minimum are held in full, and each day's settlement is paid in full, from the account's own dollars or a surety and never from the agent's credit or from ACT.

Each certified participant signs a Master Forward Agreement once, and each fill is a confirmation under it. On default the claim passes to the Association, the legal entity that owns the rulebook. The agent discloses the owner's identity into arbitration, at the Singapore International Arbitration Centre or the London Court of International Arbitration, and brings the claim at its own cost. Until the claim is paid, garnishment sends to the fund the future payments for served hours due to the defaulter, to any account of the same owner and to any registry entry on the same hardware. Arbitration takes twelve to eighteen months, and it fails against an owner with nothing to collect.

The program never learns who an owner is. It stores the score, the agent, the owner's verified capital and a keyed hash of its legal registration, so that one owner's accounts can be grouped without naming it. Their total uncollateralised exposure may not exceed the verified capital. A surety may stand behind a certified account with a funded deposit or a capped line.

Margin is posted in dollars, with one exception that is decided but not yet live. ACT is Akash's USD-pegged compute token, minted against AKT. Once Akash ships a Solana version of ACT with four transfer terms that the design requires, a certified account may post ACT for the middle slice of Figure 6, at a haircut set by formula. AKT itself is never margin,

and ACT never meets an add-on, the in-delivery minimum, a contribution to the fund, a day's settlement or a payment for served hours.

The haircut prices ACT's only way out, redemption for AKT and the sale of that AKT for dollars, from AKT's price history since March 2021, the depth of the markets and the cover in the vault behind ACT. The design's own estimates put it at 7% to 30% while the venue is small and nearer 40% to 55% as the venue's ACT grows, and it is 100% until the program can redeem ACT itself. An account whose ACT falls short has about an hour, at the seed, to add dollars, after which the program sells enough ACT to restore it without closing the position. Overclock Labs and its affiliates may not post ACT.

> **Key idea**
>
> The signature buys the allowance and nothing else. Settlement is always paid in cash, and an agent's own capital stands in front of the fund on every dollar of credit it grants.

8 Delivery

Trading in a contract ends at its last close before the month. Right after that close, a day before the month at the initial value, the program pairs every net long that wants compute with providers' free attested capacity, the assignment of Figure 3. Shorts without attested capacity are first netted, at the contract's price, against longs that asked for cash. A buyer that asked to stay keeps its nodes where the provider has sold the month and the nodes are free, and a seeded draw matches the rest, keeping each buyer with one provider where it can.

A short still without capacity after that netting is in default, as a provider that failed to deliver. It is closed at the anchor against the buyer it strands, whose position is settled in cash so that it can buy compute elsewhere. Margin set aside over the last five closes holds the gap on both sides.

At the first hour of the month the program records a one-month lease naming the provider, the buyer's key, the nodes and the month. The program runs its own leases and does not use the Akash chain's lease modules. Each hour a random panel of selected Akash validators probes each lease. The probe sends a fresh challenge to a small agent on each node, which answers with a key bound to the node's hardware attestation and to the lease. The provider cannot fake the answer without the hardware, and the buyer cannot sabotage it.

Once a day a keeper posts each lease's signed record of served and missed hours. For each served hour the buyer's account pays the provider

the frozen mark times the GPUs per node, less the 3% delivery fee, and providers are paid daily. At a frozen mark of 2.00, a served hour of the running example costs the buyer 16.00 USD and pays the provider 15.52. The probe checks the node and not the buyer's workload, so an hour is paid whether or not the buyer uses it.

For a missed hour the buyer pays nothing. The provider pays it a penalty, set from data and never less than S times the hour's value at the frozen mark, and the hour's cash value: what replacing it cost above the frozen mark, or the anchor's excess over the frozen mark where nothing replaced it. From the first missed hour the program bids on the venue's spot market for the buyer's next hour. A short outage is thus a few missed seats charged at their cash price. Figure 7 shows how a longer one becomes a walk, an outage that the program treats as a default.

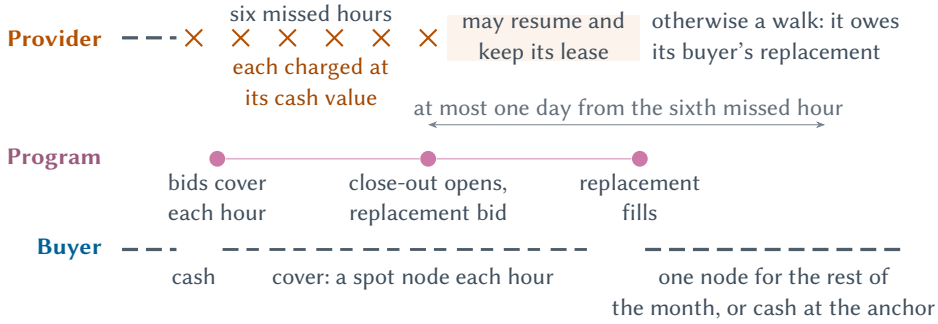


Figure 7. A buyer whose provider stops serving is covered from the next hour and moved at most once, and the provider pays the cash value of every hour it missed. One lease in a delivery month, at initial values. The provider keeps its lease if it resumes before the replacement fills and within a day. A second outage of six hours on the lease in the same month is a walk at once, and so is the first missed hour of a new outage once the lease has reached its monthly limit, at least twelve missed hours.

A buyer that changes provider between months can take its state along. The outgoing provider sends a snapshot of the disk ahead of time and a checkpoint of GPU memory at the cutover, so that state such as a model's cache moves with the buyer. The program does not check that a snapshot restores, and a buyer's state on a node that fails is lost with no cash for it, so a buyer that cares keeps checkpoints off the node.

9 Default and Close-Out

The program closes out an account on three triggers: a margin shortfall not cured within 24 hours, a provider outage that becomes a walk, and a short with no capacity left at assignment. A defaulter is fined 5% of the remaining value of its positions, at the initial value, and the fine is taken only after every loss it caused is paid.

When a provider walks, its buyers keep their positions. At the sixth consecutive missed hour, at the initial value, the program adds a bid for the buyer's remaining hours of the month, and when it fills the buyer moves once more and stays. The buyer may instead take its remaining hours in cash at the anchor. This is the choice that commercial law gives a buyer between buying substitutes and claiming the market difference [5].

A stranded buyer bears no more than the frozen mark for an hour once its claims are paid. Behind a certified defaulter, its agent's capital and the default fund front the gap at the anchor, up to the covered price of Section 10. Any cost of cover above the anchor is the buyer's claim against the defaulter, and nobody fronts it.

Later months are liquidated through the auction by a forced order, which does the work of a perpetuals exchange's liquidation engine. It is a market order with a protection price: the mark times one plus S for a forced bid, and times one minus S for a forced ask. It fills before limit orders on its side and never sets the clearing price. It enters in slices of a quarter of the contract's daily volume or five nodes, whichever is larger, so a thin month unwinds at the pace its margin assumed. Until it fills, the defaulted position is marked daily.

What a defaulter owes is met in the fixed order of Figure 8. For a certified defaulter its own money pays first, then its sureties and its agent's stratum. Next come the default fund's senior layer, the venue's own capital, and then the other certified accounts' contributions, pro rata, with replenishment capped. Together the fund's layers front no more than the covered price on any position.

What remains is a deferred claim, recorded on chain against the defaulter with a visible place in a queue. Buyers that hold for delivery are paid first, then delivering providers, then all others. Claims are paid from recoveries, first in line, from a surety's excess line, and from the senior layer's surplus above its target. Once its amount is fixed, a claim can be sold to any account on the venue.

For an anonymous defaulter the order stops at its own balance, and no fund money moves for an anonymous account under any policy. What its balance does not cover is charged pro rata against the gains credited to that settlement's winners on the contract, while those gains are still held, and it carries to later settlements if needed. In the delivery month the stranded buyer bears it on its own hours. This haircut plays the role that auto-deleveraging plays on a perpetuals exchange, but it closes no position and never reaches money a winner has withdrawn.

In Figure 5 the certified buyer's forced sell order fills at 1.45, above the covered price of 1.40, and the fund has fronted 13,125 USD, about 18.7% of notional. The position was opened less than a window before the default,

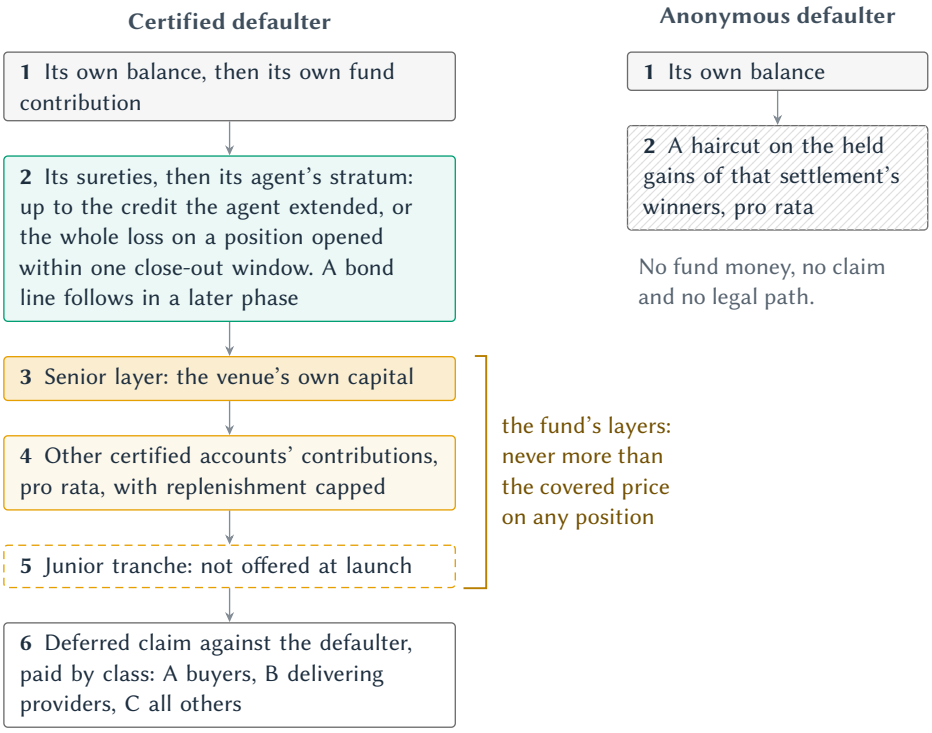


Figure 8. A certified defaulter's unpaid loss passes through its own money, its backers' capital and the fund's layers, up to the covered price, before anyone else bears it. An anonymous defaulter's loss stops at its own balance. Layers are drawn from the top. What a certified defaulter's layers do not pay is a deferred claim. What an anonymous defaulter's balance does not pay falls on that settlement's winners.

so the agent's stratum repays all of it, and the fine of 2,681 and the costs go to arbitration.

The anonymous provider fares differently. If months four to six jump from 3.00 to 4.40 early in month three and it does not top up, it is closed out, its buyer takes the rest of month three in cash at an anchor of 3.20, and the forced bid fills two closes later at 5.80. Its remaining 21,139 USD pays first, the last 3,389 falls on that settlement's winners, the buyer among them, and nothing is pursued.

> **Key idea**
>
> The order of loss is fixed in advance and run by the program. No fund money ever moves for an anonymous account, and every promise to a certified account's counterparty stops at a published price, with a claim beyond it.

10 The Default Fund

The default fund plays the role that an insurance fund plays on a perpetuals exchange, with three differences. It stands behind certified accounts only, part of it is prefunded by those accounts, and it fronts no more than a published price on any position. It is held in dollars and pays out only by program rule, and no committee decides who is paid.

The senior layer is the venue's own capital: a seed, the fees left after validators are paid, the guarantee premiums and the fines. It is drawn before any participant's money, as clearinghouse rules put a clearinghouse's own resources ahead of its members' [6]. Its seed is 1,000,000 USD of value committed in AKT and converted to USDC at funding, by one governance act. The mutual layer is prefunded by certified accounts in proportion to the exposure each brings, remains each contributor's property, and is returned when the contributor leaves. A junior tranche of outside capital would stand behind it, but it is not offered at launch.

The fund measures one quantity per position, the uncollateralised exposure

$$UE = \max\left(0,\ S \times M \times Q - P\right), \tag{3}$$

where S is the stress rate, M the mark, Q the position's remaining GPU-hours and P the collateral posted against it, including its share of its agent's stratum. It is what the fund would front if the account defaulted today and the price then moved against it by S. An anonymous account's exposure is zero by definition.

A squeeze hits every short at once and a crash every long, so the fund's target T is the larger of the shorts' total exposure under a rise and the longs' under a fall. The mutual layer holds whatever part of T the senior layer does not, so the members' burden shrinks as the senior layer grows. Contributions are set each 30-day period in proportion to exposure and called with a window's notice, at the initial values. Replenishment after defaults is capped at twice a contribution in the 30 days that follow the first default of a cluster, so a member knows its liability when it joins. Each certified account also pays a daily guarantee premium on its exposure into the senior layer.

Each contract publishes a covered price every day: the mark times one plus S for a short's counterparties, and times one minus S for a long's, with the frozen mark in delivery. The fund's layers front no more than the gap between the covered price and the mark on any position, so a default can never take more from the fund than the fund held capital against.

At a 30% stress and a score of 700, with a seasoned agent, a certified position before delivery carries exposure of about 20.9% of its value, 2,443 USD per H100A node-month at 2.00. The seed alone covers about

409 node-months on one side of the market, about 4.8 million USD of position value, and beyond that each node-month brings a contribution approaching 2,443 USD. A position in delivery brings none while it holds the in-delivery minimum.

Now take a certified provider short fifty nodes, with 600 hours of a delivery month left at a frozen mark of 2.00. It holds the in-delivery minimum, 0.30×2.00×240,000 = 144,000 USD, so the fund has no exposure to it. A squeeze lifts the anchor to 2.90, and the provider fails to top up and is closed out. Figure 9 shows what its buyers receive.

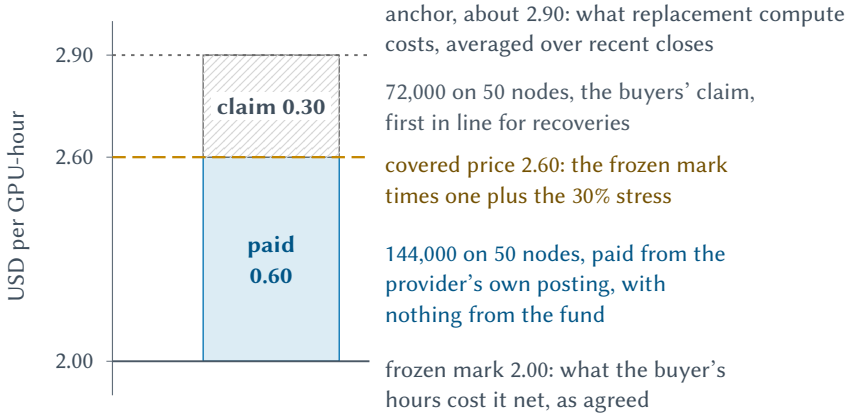


Figure 9. The buyer is paid the gap up to the covered price as each hour passes, and holds the rest as a claim against the defaulter. A certified provider short fifty nodes defaults with 600 hours left, after the anchor has risen from the frozen mark of 2.00 to about 2.90. Its own posting pays its buyers 144,000 USD, and the claim of 72,000 is first in line for recoveries, with the unpaid fine of 24,000. An illustration, not a forecast.

A cluster of certified defaults in a move larger than S can exhaust the layers. Fronting then stops, buyers in delivery are paid first from what remains, and the rest wait for recoveries.

A decided rule, not yet switched on, spends the senior layer's surplus. Above a buffer derived from the fund's own target, the surplus buys AKT on Solana markets within a daily budget, and the program burns it in the same instruction. Claims are paid first, the seed is never spent this way, and the burn stops whenever a default draws the layer below the buffer. It switches on only after a pending correction to the contribution formula, and burned surplus can no longer absorb a loss beyond the fund's stress.

> **Key idea**
>
> The fund fronts no more on any position than the stress it held capital against, published in advance as the covered price. What lies beyond is a claim, not a promise.

11 Incentives and Attacks

A design is sound only if each party does better by honouring its contract than by breaking it. A provider that keeps serving is paid the mark for every hour, because its contract price and the transfers it has made add up to the mark. One that walks earns nothing further, pays the fine and recovers only what is left of its margin.

The pull to walk comes in the delivery month, when replacement compute moves away from the frozen mark. Without the in-delivery minimum, a certified position with 600 hours left would have gained by walking on a move of about 13% for a buyer and 14% for a provider. With it, walking pays only on a move inside the month larger than S plus the fine, the move the fund holds capital against. Buyers walked away from iron ore and soybean cargoes when prices fell in 2008, and exchanges such as CME and ICE Endex raise margin for the delivery month for the same reason.

A provider could instead miss hours on purpose and sell them elsewhere in a squeeze, but each missed hour costs it the penalty and the anchor's excess over the frozen mark. Take fifty nodes, a frozen mark of 2.00, an anchor of 2.60 and a 30% stress. An hour sold elsewhere at 3.20 nets the provider nothing. At 3.50 it nets 0.30 per GPU-hour, and the monthly limit walks the lease after at most 40 such hours, worth 4,800 USD. The design bounds this gain but cannot remove it, because the anchor lags a fast squeeze.

A trader that pumps a price and sells into a certified shell meets two rules. The seller's gain is held for a window, and the shell must post in full the drop to the window's lowest mark. A buyer at 2.94 when the mark was 2.00 four settlements earlier posts 0.94 per GPU-hour on top of its requirement, and if it defaults, its agent's stratum answers for the whole loss.

A walker that fills its own buyers' cover from another entry on the same hardware, or under the same owner, is charged the whole cost, which nobody fronts. One with an unlinked second entry can still sell its buyers cover up to the covered price, at the buyers' cost and never the fund's. A market maker that sells without hardware and does not buy back before assignment defaults even if the price fell. For a certified maker the default is recorded against its agent, and for an anonymous one its full-notional margin is the deterrent.

A well-funded trader with several keys can push a thin month's mark by one band per close. It cannot withdraw the gain until the move has held for a window, a forced order's fill can never set the price for it, and its orders are public.

12 Operation and Open Matters

Every balance sits in accounts that the program holds, and only its instructions move them, as Figure 10 shows. A participant's own key deposits margin, withdraws its excess and receives payment for served hours. Circle, which issues USDC, can freeze the program's accounts, and a loss of the coin's peg would cut the dollar value of every balance. The design accepts both risks and does not mitigate them. The program's balances may earn Circle's yield for their owners, once counsel settles which balances qualify.

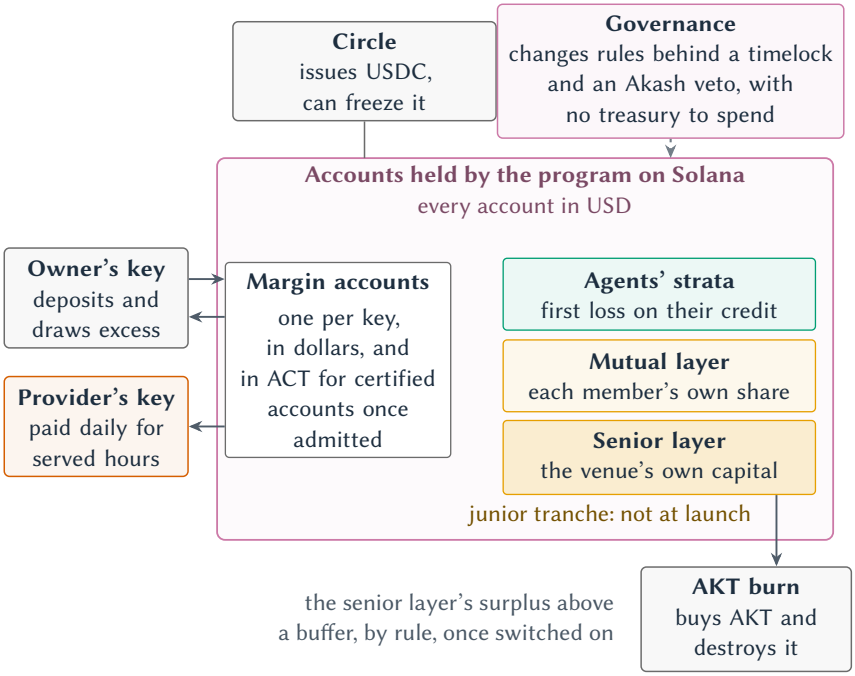


Figure 10. Every balance sits in accounts that the program holds on Solana, and only the program's rules move them. Margin is held per key, an agent's stratum and each member's contribution are held apart, and the senior layer is the venue's own capital. Governance changes rules behind a timelock and an Akash veto, and it has no treasury to spend. How the program's code is upgraded is not yet specified.

The venue is one program on Solana. Each step, from the close to settlement and close-out, is an instruction that anyone may call, and selected Akash validators call them on a rotating duty. Validators also sign the lease reference and the hourly probes, verify hardware attestations and relay transactions on request, for a share of each fee that is still to be set. They post no bond at launch, and a validator is removed if its reports persistently disagree with its panels or if it signs two conflicting reports.

Akash is moving to Solana under its governance Proposal 346, and its chain is expected to retire about two years after the market starts. From the chain's cutover, each node that performs these roles must post a bond

of its own AKT, burned only for a provable fault such as two conflicting signatures. Nobody else's AKT may be delegated to it, and its pay stays a share of fees in dollars.

At launch a multisig held by Overclock Labs' core team proposes every parameter change, every quarterly refresh of the validator set and every registration of agents, sureties and the Association. Each change waits out a seven-day timelock, during which Akash governance can veto it with a third of bonded voting power, both at the initial values. On the earlier of twelve months after launch or the Akash chain's switchover to Solana, the proposer role passes to AKT token governance on Solana, and the timelock and veto remain.

On a flagged settlement, governance may only clear the flag or cancel the move, and only while the gains are still held. It can never take back a gain that has left the venue, as the London Metal Exchange did when it cancelled a day's nickel trades in March 2022 [7]. A proposer may not resolve a flag on a settlement in which its own accounts, or those certified by an agent it controls, gained or lost.

Table 1 compares the venue with a perpetuals exchange and with a futures exchange.

Several matters remain open:

- Most numbers here are initial values that data will replace, as Appendix C records, and a shadow window to test the margin model without enforcing it is not yet scheduled.
- The fund's target may become a measured share of total exposure, a correction to its contribution formula awaits a decision, and the source of the seed's AKT and the way it is sold are open.
- Whether anonymous and certified accounts should share contracts is open.
- The legal form is open: the Master Forward Agreement for this design, the jurisdictions, the Association's form on Solana and whether garnishment can be enforced.
- Deferred to a later governance design are the validators' selection formula and their bond and removal rule before the cutover, the window for resolving a conflicted flag, the timelock on the genesis seed and the separation of roles.
- How the program's code is upgraded is not yet specified.
- ACT counts only once Akash ships Solana ACT with the four terms.
- The seed data's sources are open, and Akash's provider uptime history, which will seed the monthly outage limit, has not been obtained.

Table 1. The venue settles like a futures clearinghouse, holds funds like an on-chain exchange, and delivers compute. Typical features, which vary by exchange.

	This venue	Perpetuals exchange	Futures exchange
Traded	Node-months of a GPU grade, delivered as compute	Perpetual contracts on a price index, settled in cash	Dated contracts, delivered or settled in cash
Counterparty	The program, for every position	Varies: another trader or a liquidity pool	The clearinghouse, through clearing members
Custody	Accounts held by the program	The exchange's smart contracts	Clearing members and the clearinghouse, in segregated accounts
Collateral	Dollars in a stablecoin, and later ACT for part of a certified requirement	Stablecoins, often other tokens	Cash and eligible securities, at haircuts
Prices	A daily call auction at one price	A continuous book or pool	A continuous book
Mark	The venue's own prints, confirmed by a lease-market anchor	An oracle index of outside prices	A settlement price from the exchange's own trading
Margin	Full value, or risk-based with an underwritten allowance	Leveraged, with maintenance margin	Risk-based initial margin
Gains and losses	Cash each day, gains held one window	Credited to margin continuously, with funding	Cash each day
Default	Forced order into the auction, then a capped waterfall	Liquidation, then an insurance fund	Defaulter's margin, clearinghouse capital, members' fund
Beyond that	Claims (certified) or a haircut on winners (anonymous)	Auto-deleveraging of winning positions	Assessments, then rulebook recovery tools
Identity	Any wallet, or certified by an underwriter	Usually a wallet	Known customers of clearing members
Rules	Program rules, with parameters set by a proposer under a timelock and veto	Operator or token governance	Exchange rulebooks, under a regulator

13 Taking Part

Seven roles are open, and Table 2 sets them out. Each earns only from the activity behind it, and none earns a fixed or promised return. During the pilot only certified accounts may place orders, so a participant that wants to trade then must first be certified.

For providers and buyers the gain is certainty rather than income. A provider that sells forward knows what each served hour will pay. If its buyer abandons the lease, it keeps the nodes to re-rent and is paid the gap at the anchor, up to the covered price. A buyer knows its cost and receives its compute, or cash at the reference price if its provider fails.

Table 2. Each role puts up something different and earns from a different source. Fees and rates are initial values where the design marks them so. No role carries a promised return.

Role	Puts up	Earns from	Can lose
Provider	Attested nodes and margin	The contract price on each served hour, paid daily, less the 3% delivery fee	Penalties and cash on missed hours, a walk's cost, the fine
Buyer	Margin, or the full prepayment if anonymous	Compute at a fixed price	The difference if the price falls, a claim left unpaid, a haircut
Trader or market maker	Margin	Trading gains, net of fees	Losses on price moves, a default at assignment
Certification agent	A conduct bond and a stratum, one for one at first	The credit premium on its allowances, any diligence fee, a share of recoveries	Its stratum on its accounts' defaults, its bond on misconduct
Surety	A funded deposit or a capped line	Premiums agreed privately with the account it backs	What it posted or lined, on that account's default
Certified account, as fund member	Its mutual-layer contribution	Yield, where eligible, and the return of its contribution when it leaves	Draws for other certified defaults, and capped replenishment
Selected validator	Its service node, and its own AKT bond after the cutover	A share of each fee for the work it signs	Its seat and fees, and after the cutover its bond on a provable fault

A market maker that sells without hardware and buys from providers later nets to zero, and the provider's capacity reaches the buyer at assignment. Any account may also buy a fixed deferred claim and collect what

it recovers. Bond pools behind certified credit lines and the fund's junior tranche, two further roles for outside capital, are not offered at launch.

14 Risks

A participant can lose money or access in the ways below.

- **Price moves.** Losses are paid in cash every day, and an account that cannot top up within 24 hours of a call is closed out. A gain waits one close-out window, or two if flagged, before it can leave.
- **Certified defaults.** A certified defaulter's counterparties are paid at once only up to the covered price. The rest is a claim paid from recoveries, surety lines and surplus, and arbitration takes twelve to eighteen months and fails against an owner with nothing to collect. Defaults in a move larger than the stress rate can exhaust the fund.
- **Anonymous defaults.** An anonymous defaulter's loss beyond its margin falls on that settlement's winners as a final haircut, certified winners included, and in delivery on the stranded buyer.
- **Mutual liability.** A certified account's contribution can be drawn for others' defaults, and it can be called to replenish up to twice its size in the 30 days after a cluster's first default. The formula that sizes contributions has a correction pending.
- **Forced orders.** A few sellers can hold a forced bid near its protection price for a close, at the defaulter's cost and then the fund's.
- **Service and replacement.** Cover may move a buyer to a different node each hour, a failed node's state is lost with no cash for it, and a failed handover leaves a buyer unbilled but uncovered for up to two hours. In a sold-out month cover may find no offer inside the covered price, and cash at the anchor can lag the real cost of compute. A probe reading is final, with no dispute.
- **Withholding.** A provider can still profit from missing hours in a fast squeeze, at most about 40 hours a month per lease at the initial values, and its buyer bears what the cash paid does not cover.
- **Provider charges.** A provider pays a penalty and the cash value of each missed hour, and on a walk owes its buyers' replacement and the fine. A short left without capacity at assignment defaults even when the price fell.
- **The mark.** A well-funded trader with several keys can move a thin month's mark one band per close, and off-market volume can move a settlement price inside its collar. While a grade's lease leg rests on one

provider, as B300A's may at launch, that provider can move the day's anchor within its band.

- **ACT.** Posted ACT can be sold within hours of a shortfall, at prices that fall with AKT, and it loses value in an Akash crash, when its posters are likeliest to fail. Akash's upgrade authority, later its governance, controls how ACT redeems.
- **Initial values.** Most parameters are seeds or placeholders, and the stress rate estimates the tail from a short record. Margin set too low leaves more to the fund and the claims queue.
- **USDC.** A depeg cuts every balance's dollar value, and a Circle freeze halts every transfer, settlement and withdrawal, with no mitigation.
- **Software and operations.** A defect in the program could lose or lock funds, and this paper describes a design, not audited code. Settlement depends on Solana, keepers, price feeds and the validators' signed readings, and a halt of the Akash chain during its move to Solana suspends the lease leg and the veto.
- **Governance.** A captured proposer can set any parameter that Akash governance fails to veto in time, and the program's upgrade path is not yet specified.
- **Legal.** The legal form is unsettled, and garnishment may not be enforceable everywhere. An open claim against a certified owner blocks withdrawals from all of its accounts for the length of the arbitration.
- **Privacy.** Funding a key is a public transfer, and a certified account's positions and margin flows are public under its key. A leak of the Association's hashing key would let its holder re-identify certified owners.

15 Conclusion

We have proposed a forward market in GPU compute that needs no trust in a named counterparty. One program on Solana stands between every buyer and seller of node-months, prices every position daily from the market's own trades, and moves each day's losses to the winners in dollars before they can grow. Delivery is physical and probed every hour, and each side nets its contract price on every served hour. When a party fails, cover and cash keep the other side whole within limits published in advance: an anonymous defaulter's own margin, or for a certified defaulter its agent's capital and a default fund up to the covered price, with a claim beyond it. Many values are still initial, and the open matters are named here. Providers and buyers that need to fix the price of compute, and traders that can make markets in it, can study these roles and risks and take part when the venue opens, first as certified accounts in the pilot.

References

[1] NVIDIA Corporation. *Annual Report on Form 10-K for the fiscal year ended January 26, 2025.* Data Center revenue for fiscal year 2025 was 115.2 billion US dollars.

[2] CME Group. *History of CME Group.* The timeline records that in 1865 the Chicago Board of Trade formalised grain trading with standardised agreements called futures contracts.

[3] League of Entropy. *drand: a distributed randomness beacon.* https://drand.love.

[4] U.S. Commodity Futures Trading Commission. Press release of 9 January 2023 announcing charges over the manipulation of Mango Markets in October 2022.

[5] Uniform Commercial Code, Article 2, §§ 2-712 and 2-713: a buyer whose seller fails may buy substitute goods and recover the extra cost (cover), or recover the difference between the market price and the contract price.

[6] Regulation (EU) No 648/2012 on OTC derivatives, central counterparties and trade repositories (EMIR), Article 45: a central counterparty uses its own dedicated resources before the default fund contributions of non-defaulting members.

[7] London Metal Exchange. Notice of 8 March 2022 suspending nickel trading and cancelling trades executed that day.

A The Running Example in Full

Every figure below follows the design's worked examples at initial values: a margin confidence of 99.5% ($z = 2.58$), a seeded daily volatility of 2%, a close-out window of four days, an illustrative stress rate of 30%, an allowance of 15% at a score of 700 and a fine of 5%. Amounts are in USD, prices are in USD per GPU-hour, and a month is 730 hours. Rounded figures are carried as the design's examples carry them.

A.1 The trade and margin at trade

Item	Computation	Value
GPU-hours	$6 \times 730 \times 8$	35,040
Notional	$2.00 \times 35{,}040$	70,080
Taker fee, 5 basis points	$0.0005 \times 70{,}080$	35.04
Maker fee, 1 basis point	$0.0001 \times 70{,}080$	7.01
Served hour at a frozen 2.00	2.00×8	16.00
Delivery fee on that hour, 3%	0.03×16.00	0.48
Transfer on a 0.10 rise	$0.10 \times 35{,}040$	3,504
Anonymous posting, each side	full notional	70,080
Certified base rate	$2.58 \times 0.02 \times \sqrt{4}$	10.32%
Certified requirement	$0.1032 \times 70{,}080$	7,232
Allowance at a score of 700	$0.30 \times (700 - 400) \div 600 = 15\%$	1,085
Own dollars, at least	$0.20 \times 7{,}232$	1,446
Certified posting	$7{,}232 - 1{,}085$, 8.8% of notional	6,147

A.2 The certified buyer through a fall

The buyer opened its position at 2.00 two settlements before the fall. The covered price that binds is the one published before the fund first fronted anything, $2.00 \times 0.70 = 1.40$.

Step	Computation	Value
Day 1	Curve falls 15% to 1.70, owed $0.30 \times 35{,}040$	10,512
	Paid by the buyer, all of its posting	6,147
	Fronted by the fund's senior layer	4,365
	Volatility $\sqrt{0.94 \times 0.02^2 + 0.06 \times \ln(0.85)^2}$	4.43%
	Formula rate $2.58 \times 0.0443 \times 2$	22.8%
	Applied rate, capped at $1.25 \times 10.32\%$	12.9%
	Requirement $0.129 \times 1.70 \times 35{,}040$	7,684
	Allowance, 15% of the requirement	1,153
	Floor, the requirement less the allowance, and grace begins	6,531
Day 2	Curve falls 10% to 1.53, owed $0.17 \times 35{,}040$ and fronted	5,957
	Grace lapses, and the fine is $0.05 \times 1.53 \times 35{,}040$	2,681
	Forced sell order protected at 1.53×0.70	1.07
Day 3	Fills at 1.45, gap $0.08 \times 35{,}040$ fronted	2,803
Total	Fronted, 4,365 + 5,957 + 2,803, 18.7% of notional	13,125
	Repaid by the agent's stratum, the position being fresh	13,125
	Stratum held against the account, $1{,}085 + 0.30 \times 70{,}080 - 7{,}232$	14,877

A.3 Fifty certified nodes in a delivery month

Item and computation	Value
GPU-hours left, $50 \times 8 \times 600$	240,000
Value at the frozen mark, $2.00 \times 240{,}000$	480,000
Base requirement $0.1032 \times 480{,}000$, less a 15% allowance of 7,430	42,106
In-delivery minimum $0.30 \times 480{,}000$, which binds	144,000
Exposure to the fund, $0.30 \times 480{,}000 - 144{,}000$	0
Covered price 2.00×1.30	2.60
After the anchor reaches 2.90: delivery add-on $0.90 \times 240{,}000$	216,000
Floor $42{,}106 + 0.80 \times 216{,}000$, against 144,000 held	214,906
Paid as cover runs from the provider's posting, $0.60 \times 240{,}000$	144,000
Fronted by the agent's stratum and the fund	0
Buyers' claim, $0.30 \times 240{,}000$	72,000
Fine, $0.05 \times 480{,}000$, unpaid and part of the claim	24,000
Buyers' claim had the anchor reached 4.20, $1.60 \times 240{,}000$	384,000

A.4 The anonymous provider through a rise

Step	Computation	Value
Month 2 end	GPU-hours left, $4 \times 730 \times 8$, with the curve at 3.00	23,360
	Buyer holds $3.00 \times 23{,}360$	70,080
	Provider holds $70{,}080 - 23{,}360$	46,720
	Provider's floor $0.30 \times 3.00 \times 23{,}360$	21,024
Month 3, day 2	Months four to six print 4.40 twice, transfer $1.40 \times 17{,}520$	24,528
	Provider holds $46{,}720 - 24{,}528$	22,192
	Floor $0.30 \times (3.00 \times 5{,}456 + 4.40 \times 17{,}520)$	28,037
	Add-on, anchor 3.20 less frozen 3.00, on 5,456 GPU-hours	1,091
	New floor, and grace begins	29,128
Month 3, day 3	Closed out with 5,264 GPU-hours of month three left	
	Fine $0.05 \times (3.00 \times 5{,}264 + 4.40 \times 17{,}520)$, never paid	4,644
	Buyer elects cash, $0.20 \times 5{,}264$	1,053
	Provider holds $22{,}192 - 1{,}053$	21,139
	Forced bid protected at the lesser of 4.40×1.30 and $4.40 + 21{,}139 \div 17{,}520$	5.61
Next close	Prints 6.20, mark to the band edge 5.80, debit $1.40 \times 17{,}520$	24,528
	Paid from the provider's balance	21,139
	Charged to that settlement's winners	3,389

Step	Computation	Value
Close after	Prints 5.80, the forced bid fills at 5.80, and the haircut is final	3,389

A.5 Sizing and incentives

Item and computation	Value
Exposure share, $(0.30 - 0.1032) + 0.8 \times 0.15 \times 0.1032$	20.9%
One node-month at 2.00, $2.00 \times 8 \times 730$	11,680
Its exposure, $0.2092 \times 11{,}680$	2,443
Node-months the seed covers, $1{,}000{,}000 \div 2{,}443$	409
Their position value, $409 \times 11{,}680$	4.8 million
Walk break-even before the minimum, buyer, $(42{,}106 + 19{,}200) \div 480{,}000$	13%
Walk break-even before the minimum, provider, $(42{,}106 + 24{,}000) \div 480{,}000$	14%
Penalty floor per GPU-hour, 0.30×2.00	0.60
Withholding at 3.20, per GPU-hour, $1.20 - 0.60 - 0.60$	0
Withholding at 3.50, per missed hour on 400 GPUs, 0.30×400	120
Most missed hours before a walk at a limit of 12, $11 + (6 + 24 - 1)$	40
Most kept, 40×120	4,800
Trailing loss posted by a buyer at 2.94 after a mark of 2.00	0.94
Anonymous seller reaches its floor at, $2 \div (1 + 0.30)$, times its price	1.54

A.6 ACT on the certified buyer's requirement

ACT does not count until Solana ACT carries the design's four transfer terms. The haircut below is illustrative, the figure the design's own ACT example uses, and not a measured value.

Item and computation	Value
Requirement at trade, with no add-ons	7,232
Own dollars, at least $0.20 \times 7{,}232$	1,446
Most that ACT may count for, $7{,}232 - 1{,}085 - 1{,}446$	4,701
ACT needed at a 40% haircut, $4{,}701 \div 0.60$	7,835
Own dollars as a share of notional, $0.20 \times 10.32\%$	2.1%

B Glossary

ACT. Akash's USD-pegged compute token, minted against AKT. Once admitted, it may meet part of a certified account's requirement at a haircut.

Anchor. The venue's reference price for replacement compute: a blend of transacted prices on the Akash lease market and the venue's nearest trading month, each weighted by its precision.

Assignment. The step, a day before each month at the initial value, that pairs buyers with providers' attested capacity.

Attestation. A signed report from a node's hardware that proves what hardware and software it runs.

Band. The range around a price, a multiple of its measured volatility, inside which a move is admitted at once.

Block order. An order across consecutive months that fills in every month or in none.

Certification agent. A registered underwriter that verifies and scores certified accounts and extends their unsecured allowance.

Certified account. An account with a legal identity behind it, scored by a certification agent.

Close. The daily call auction at which each contract clears at one price.

Close-out window (W). The days from a margin breach to the first fill of the forced order, seeded at four.

Cover. Compute bought each hour on the spot market for a buyer whose provider has stopped serving.

Covered price. The published price up to which the fund's layers front a defaulter's debt on any position.

Deferred claim. A certified defaulter's recorded debt beyond what the layers fronted, paid from recoveries and saleable once fixed.

Delivery add-on. Margin that holds the gap between a contract's mark and the anchor near and during delivery.

Financial short. A short with no attested capacity behind it.

Frozen mark. A contract's settlement price, fixed for its delivery month.

Grade. A class of node defined by thresholds a machine can check, such as H100A or B300A.

Haircut. A cut in value. On ACT it is the share of value that does not count as margin. On an anonymous default it is a pro rata cut in a settlement's held gains that absorbs the unpaid loss.

Held gain. A day's gain that counts as margin but cannot be withdrawn for one close-out window.

In-delivery minimum. The collateral a certified position holds in its delivery month: one window of stress on the frozen value of its remaining hours.

Keeper. The validator on duty that runs the program's instructions.

Lease. The program's one-month record pairing a buyer's key with a provider's attested nodes.

Lease market. The market Akash runs today, in which tenants post deployments and providers bid.

Margin. A deposit that secures performance.

Mark. The price at which a position is valued each day.

Mutual layer. The part of the default fund that certified accounts prefund.

Node-month. One node of one grade in one region for every hour of one calendar month. It is the contract.

Notional. The contract price times a position's GPU-hours.

Recoverability score. An agent's estimate, from 0 to 1,000, of what a legal claim against an owner would collect.

Senior layer. The venue's own capital in the default fund.

Settlement window. A contract's last five closes before its month, at the initial value.

Spot market. The venue's market for graded compute delivered within the hour.

Strip. A run of consecutive node-months.

Stratum. An agent's own capital, held by the program, which pays before the fund on the accounts it certified.

Stress rate (S). A high quantile of the price move over one close-out window, measured from data.

Surety. A third party that stands behind a certified account with a deposit or a line.

Unsecured allowance. The part of a certified account's base requirement that it need not post.

Uncollateralised exposure. What the fund would front if an account defaulted today and the price moved by the stress rate.

Variation margin. The daily transfer of a position's change in value.

Walk. A provider's outage that the program fixes as a default.

C Parameters and Their Status

Table 3. Most numbers in this paper are initial values that data will replace. "Decided" means the design states the value and does not list it for calibration, "Initial" means a seed or placeholder, and "Open" means not yet settled.

Parameter	Value used here	Status
Contract	one node-month of H100A or B300A in NA, EU or APAC	Decided
B300A floors	10th percentile of benchmarks, first read at 20 nodes	Initial
Unit of account	USD for every amount, price and fee	Decided
ACT as margin	certified accounts only, part of the requirement, formula haircut, not live until Solana ACT has four terms	Decided
Pilot	certified accounts only, ended once by governance	Decided
Auction cadence	one close a day, expected to shorten	Initial
Random close	within a 10-minute window	Initial
Close extension	5 minutes on a 10% move in 15 minutes, at most twice	Initial
Fees	maker 1 and taker 5 basis points, delivery 3% of each served hour's payment	Decided
Validators' share	half of each fee, at the placeholder	Open
Margin confidence	99.5%, $z = 2.58$	Initial
Daily volatility	2% seed, then measured	Initial
Close-out window W	4 days seed, then the 90th percentile of the record	Initial
Volatility floors	long-run volatility, and 75% of the worst of 90 closes	Initial
Rate step cap	25% per close	Initial
Forced-order slice	the larger of 25% of daily volume and 5 nodes	Initial
Allowance	0 at a score of 400 to 30% at 1,000	Initial
Own dollars	at least 20% of the requirement	Initial
Floor on add-ons	80%	Initial
Grace	24 hours	Initial
Size limit	uncollateralised exposure up to 1.0 times verified capital	Initial
Stress rate S	99.9% quantile, measured, and 30% in the examples	Initial
In-delivery minimum	S on the frozen value, phased in over 5 closes, the phasing initial	Decided
Hold on gains	one close-out window, two when flagged, the length open	Decided
Settlement window	5 closes	Initial
Assignment lead	24 hours	Initial
Default fine	5% of remaining value at the mark	Initial

Parameter	Value used here	Status
Missed-hour penalty	from data, at least S of the hour's frozen value	Decided
Cover start	after 1 missed hour	Open
Walk threshold	6 missed hours in a row, then up to 24 hours to resume	Initial
Monthly outage limit	99th percentile of uptime data, at least 12 hours	Initial
Handover grace	2 hours	Initial
ACT top-up window	1 hour seed, then measured	Initial
Fund seed	1,000,000 USD in AKT, converted to USDC	Decided
Senior layer first	drawn before members' contributions, open to review	Decided
Fund target	the larger directional sum of exposure, which may change	Decided
Contribution formula	a correction awaits a decision	Open
Contribution period	30 days	Initial
Replenishment cap	twice the contribution per 30-day cooling-off	Initial
Headroom premium	capped at 20% a year over 3 years	Initial
Surplus burn	above a buffer, by rule, not on until the correction above	Decided
New agent's stratum	one for one with its allowances	Decided
Agent's recovery cut	15%, with a bonus for speed	Initial
Bond pools	not offered at launch	Decided
Junior tranche	not offered at launch, open to review	Decided
Governance timelock	7 days	Initial
Veto threshold	a third of bonded voting power	Initial
Proposer handover	earlier of 12 months and the chain's switchover	Decided
Validator set	refreshed quarterly, selection formula to be set	Open
Validator bond	none at launch, own AKT from the cutover with no delegation, its size initial	Decided
Yield on balances	eligibility awaits counsel	Open

Notice

This paper describes a market design that may change, and many values it quotes are initial values. It is not an offer to sell, or a solicitation of an offer to buy, any contract, token or security, and it is not investment, legal or tax advice. Nothing in it promises a return or predicts a price. A participant can lose the margin it posts. A certified participant can also lose its contribution to the default fund, and owe its replenishment, when other certified accounts default, even if it never defaults itself. A certified participant that defaults can owe more than it posted.