A VISUAL, WORKED-EXAMPLE GUIDE

Implied Orders

How a matching engine builds synthetic liquidity from the orders that already exist — explained from the ground up.

Implied IN | Implied OUT | No new liquidity

Est. reading: a full session · Level: beginner

J. Persson, 2026

START HERE

What you'll walk away understanding

01

The order book

How buy and sell interest is stored and matched.

02

Spreads & combos

Instruments built from two or more other instruments.

03

Implied IN

Turning outright leg orders into a spread quote.

04

Implied OUT

Turning a spread + a leg into an outright quote.

05

Why it's powerful

Tighter markets and more fills — for free.

06

The catch

No new liquidity, and why depth must be capped.

PRIMER

Dated instruments & combos

Why oil trades by delivery month — and how a single combo order bundles two months into one.



A dated instrument settles in a specific month

An oil future isn't just “oil” — it's a barrel for delivery in a named month. Each month is a separate contract with its own price and its own order book.

FEB	MAR	APR	MAY	JUN	JUL
WTI Crude	WTI Crude	WTI Crude	WTI Crude	WTI Crude	WTI Crude
$77.8	$78.2	$78.5	$78.8	$79.1	$79.3

Illustrative WTI prices, $/barrel.

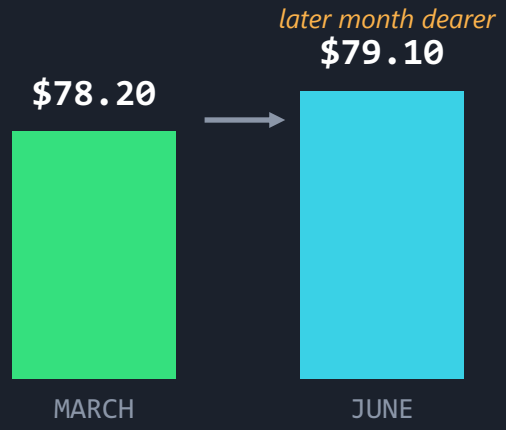
“March oil” and “June oil” are two different instruments — you can buy one and sell the other independently.

PRIMER · 2

Why March and June don't cost the same

The price gap between months reflects the cost and expectations of holding oil over time.

THE SAME BARREL, TWO DATES



WHAT DRIVES THE GAP

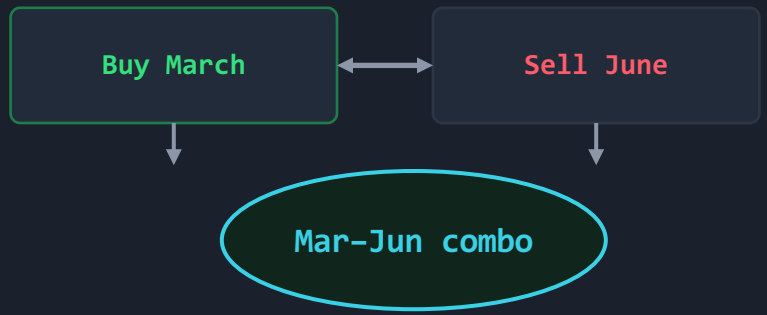
- **Storage & insurance**
  holding barrels until June costs money
- **Financing**
  cash tied up in the barrel earns interest elsewhere
- **Seasonality & outlook**
  expected supply and demand shift by month

June > March → “contango”

A combo order trades two months at once

Instead of sending two separate orders, a combo (spread) order bundles both legs into ONE instrument that fills together, in a fixed 1:1 ratio.

TWO LEGS, ONE TICKET



HOW IT'S PRICED

`combo price = March − June`

One number to quote, one fill for both legs.

- No “legging risk” — you never get one leg without the other.
- You trade the relationship between months, not oil's outright direction.

Worked example: buying the Mar–Jun combo

You buy 1 Mar–Jun combo. With March at 78.20 and June at 79.10, the two legs fill together:

A **Buy the March leg**

`fill @ 78.20`

B **Sell the June leg**

`fill @ 79.10`

=

`combo price = 78.20 − 79.10 = -0.90`

`net cash = +79.10 − 78.20 = +0.90 credit`

YOU PAID

−0.90

for the spread

You are now LONG the March–June time spread — one fill, both legs, no legging risk.

Illustrative prices, $/barrel.

Closing the trade: how you take profit

You are long the spread at −0.90. To take profit you sell it back later — at a higher (less negative) price.

1 **You are long the spread**

`entry @ -0.90`

2 **March strengthens vs June**

`spread now = 78.70 − 79.10 = -0.40`

= **Sell the spread to close**

`profit = −0.40 − (−0.90) = +0.50`

YOU MADE

+0.50

per barrel

≈ +$500 per 1,000-bbl contract — you sold the spread back at its higher value.

Illustrative prices, $/barrel. A long spread profits when the spread rises.

THE PROBLEM

Two liquid legs — but no market in the spread

You want to trade the March–June spread. Both outright books are full of resting orders — yet the spread's own book is empty. There is simply nothing to trade against.

MARCH (real)

PRICE	SIZE
100.5	8
100	12
99	10
98.5	14

JUNE (real)

PRICE	SIZE
98.5	11
98	18
97	15
96.5	9

MARCH–JUNE SPREAD

— no asks —

— no bids —

EMPTY

Same barrels, same traders — but the liquidity is locked inside the two leg books. To anyone looking only at the spread, the market looks dead.

THE WORKAROUND

Your only option: leg in by hand — and hope

With no market in the spread, you must send two separate orders and fill them one at a time. In between the fills, prices can move against you.

1 Buy the March leg

`FILLED @ 100`

You are now long March, as planned.

→

2 Turn to sell June

`BID 97 → 95`

The market didn't wait — June's bid slipped while you acted.

→

! Half-done & exposed

`SPREAD COST 5, NOT 3`

Sell worse, or sit with a naked leg you never wanted.

`LEGGING RISK` You can end up with one leg done and the other away from you — a worse spread, or an open position you never intended to hold.

THE IDEA IN 30 SECONDS

Liquidity you can't see — until the engine connects it



An implied order is a real market re-expressed in another instrument — not extra liquidity, just a new view of the same orders.

- *Cyan = implied / synthetic throughout this deck.*

THE ENGINE IMPLIES A MARKET

Bid 1 Ask 3

built entirely from the two leg books

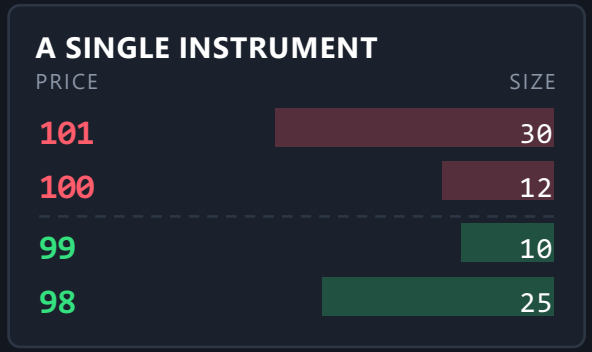
SECTION I

Foundations

The order book, outright instruments, and the spreads that are built on top of them.



The order book: where buyers and sellers queue



ASKS — people willing to SELL

Lowest ask is the best price to buy at.

BIDS — people willing to BUY

Highest bid is the best price to sell at.

Each row is a price level; the number is how much size is resting there. Orders match when a buyer and seller agree on price — highest bid meets lowest ask.

An “outright” is just one thing, bought or sold

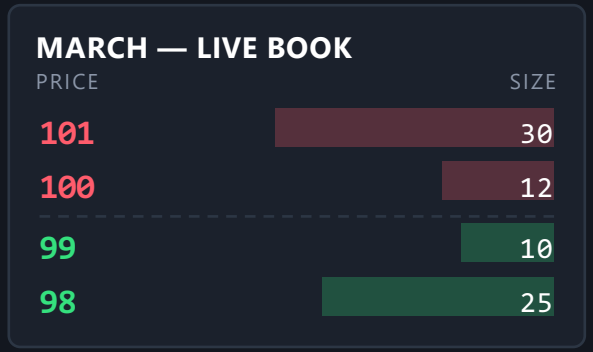
EXAMPLE

March Crude Future

One contract. You either buy it or sell it. Its price stands on its own — hence “outright.”

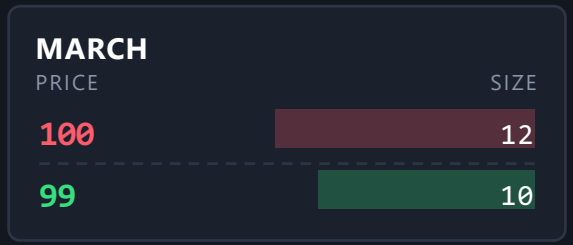
BUY March **SELL** March

Two directions, one instrument. Simple.



Best market: buy at 100, sell at 99.

Best bid, best ask, and the bid–ask spread



BEST ASK (buy here) 100

BEST BID (sell here) 99

BID–ASK SPREAD 100 − 99 = 1

The gap a taker pays to cross. Tighter is better — and implied orders help tighten it.

A combination instrument: the calendar spread

A spread is ONE tradeable instrument made of TWO legs. Buying it does both trades at once, in fixed proportion.

DEFINITION

Spread = March − June

BUY the spread

= BUY March + SELL June

SELL the spread

= SELL March + BUY June

ONE PRICE, TWO LEGS



Why traders quote spreads directly

Roll positions

Move exposure from an expiring month to the next in a single trade.

Trade relationships

Bet on the gap between months, not the outright direction of the market.

Lower leg risk

Both legs fill together, so you never get “half-done” at a bad price.

Because spreads are traded in their own right, they need their own order book — and that is exactly where liquidity gets stranded.

The fragmentation problem

Each instrument has its own book. A spread trader and two outright traders can be willing to do exactly matching business — and never see each other.

MARCH book

`deep & liquid`



walled off

JUNE book

`deep & liquid`



walled off

SPREAD book

`thin / empty`



walled off

SECTION II

The problem, made concrete

A trade that clearly should happen — but the books can't find each other on their own.

Scenario: two liquid legs, an empty spread

MARCH

PRICE	SIZE
100	12
101	30
99	10
98	25

JUNE

PRICE	SIZE
98	18
99	22
97	15
96	20

MARCH–JUNE SPREAD

empty

no bids · no asks

A customer wants to BUY the spread at a fair price — but the spread book shows nothing. To them, the market looks dead.

The liquidity is right there

Look what the leg books already allow, if we combine them:

SELL the spread synthetically

A — Sell March into its best bid

`fill @ 99`

B — Buy June from its best ask

`fill @ 98`

`net spread = 99 − 98 = 1`

SO THE SPREAD IS SELLABLE AT 1

The willingness to trade already exists — parked in the March and June books. Nothing new is needed.

The only missing piece:

someone to post that price in the spread book automatically.

The question that implied orders answer

“If the orders needed to make a market already exist in related books, why should the trader have to find and combine them by hand?”

Answer: they shouldn't. The matching engine does it for them — continuously, automatically.

It publishes IMPLIED ORDERS: synthetic quotes derived from real ones in other instruments.

Meet the implied order

DEFINITION

An implied order is a synthetic bid or ask the engine posts in one instrument, derived from real resting orders in related instruments — and executable only by trading those real orders.

Real-backed

Every implied order points to real orders standing behind it.

Automatic

Recalculated live as the underlying books change.

Disappears

If the real orders vanish, the implied one instantly does too.

SECTION III

Implied IN

Outright leg orders → a synthetic quote in the spread book.



Setup: the two leg books we'll use

MARCH

PRICE	SIZE
100	12
101	30
99	10
98	25

JUNE

PRICE	SIZE
98	18
99	22
97	15
96	20

BEST PRICES

March bid
99

March ask
100

June bid
97

June ask
98

Spread = March − June. We'll imply its bid and ask next.

Build the implied spread BID

An implied BID = the best price at which the spread can be SOLD, using the legs.

1. To sell the spread, SELL March → hit the March bid

   `March bid = 99`

2. …and BUY June → lift the June ask

   `June ask = 98`

3. `implied spread bid = 99 − 98 = 1`

IMPLIED SPREAD BID

1

`= MarchBid − JuneAsk`

`Size = min(10, 18) = 10`

Build the implied spread ASK

An implied ASK = the best price at which the spread can be BOUGHT, using the legs.

1. To buy the spread, BUY March → lift the March ask

   `March ask = 100`

2. …and SELL June → hit the June bid

   `June bid = 97`

3. `implied spread ask = 100 − 97 = 3`

IMPLIED SPREAD ASK

3

`= MarchAsk − JuneBid`

`Size = min(30, 15) = 15`

A spread market appears out of the legs

Before: the spread book was empty. After: a live two-sided market — entirely implied.

BEFORE

MARCH–JUNE SPREAD

— empty —

→

AFTER (IMPLIED)

ASK	3	size 15
BID	1	size 10

Every price here is backed by real March & June orders.

Watch it trade: one order, three fills

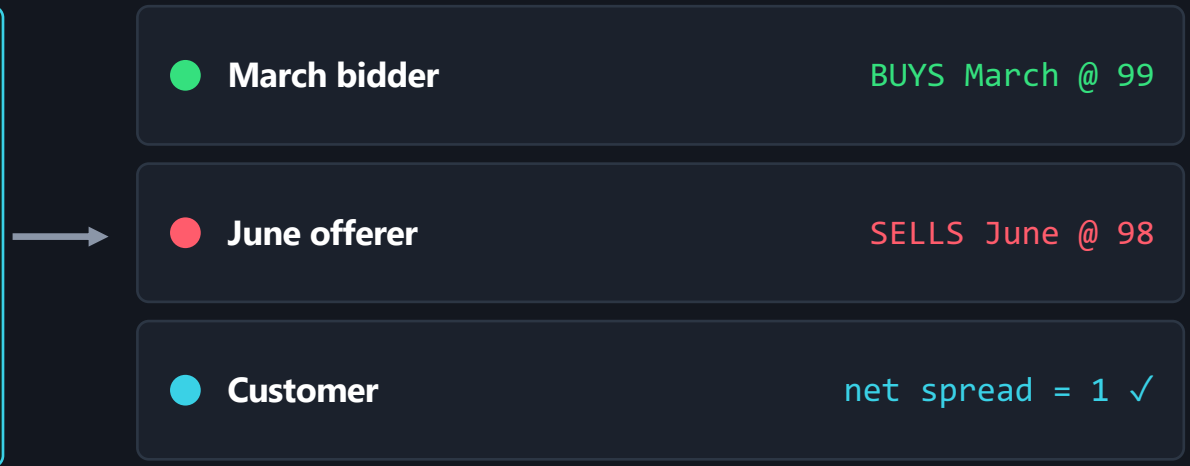
A customer SELLS 10 of the spread at the implied bid of 1. Here's what actually executes:

INCOMING

Sell 10 spread

`@ price 1`

The engine unwinds it into the real books →



Three parties, one instant. The implied bid was just a convenient face on orders that were already there.

Implied IN, in one line

real leg orders → **implied spread quote**

"IN" because liquidity flows INTO the combined instrument from its legs.

implied spread BID

= March bid − June ask

implied spread ASK

= March ask − June bid

SECTION IV

Implied OUT

A spread order + one real leg → a synthetic quote in the other outright.



Setup: a resting spread order meets a leg

Now the spread book is NOT empty. Someone is bidding the spread — and we'll turn that into an outright quote.

SPREAD (real order)

BID 2

size 10

buy March, sell June

net 2

JUNE

PRICE	SIZE
98	18
97	15

MARCH

PRICE	SIZE
101	30
98	8

March bid is only 98 — weak. Watch the implied bid improve it.

Build the implied MARCH bid

The spread buyer must BUY March and SELL June. Give the “sell June” leg to a real June buyer, and what's left is a March bid.

1. Spread buyer wants net

   `March − June = 2`

2. Real June buyer takes the June leg

   `sell June @ 97 (June bid)`

3. `implied March bid = 2 + 97 = 99`

IMPLIED MARCH BID

99

`was 98 → now 99`

The synthetic bid betters the real book.

Watch it trade: the synthetic leg fills

A seller hits the implied March bid of 99 with 10 lots. Everyone gets exactly the trade they posted:

INCOMING

Sell 10 March

@ price 99

Fills against the implied bid →

Incoming seller	SELLS March @ 99
Spread bidder	BUYS March @ 99, SELLS June @ 97
June bidder	BUYS June @ 97
Spread bidder net	99 − 97 = 2 ✓

The spread order and the June order already existed — the implied March bid simply let a March seller reach them.

The four building blocks

All implication reduces to arithmetic on best prices. For Spread = A − B:

IN	**Implied spread BID**	`A bid − B ask`
IN	**Implied spread ASK**	`A ask − B bid`
OUT	**Implied A bid**	`Spread bid + B bid`
OUT	**Implied B ask**	`A ask − Spread bid`

Same principle each time: reshuffle real orders across instruments so a price is guaranteed to be executable.

Implied OUT, in one line

spread order + real leg quote → **implied outright**

"OUT" because liquidity flows OUT of the combined instrument into an outright leg.

IN and OUT are two directions of the same bridge. Together they keep every related book in sync — automatically.

SECTION V

Why it's so powerful

In combination, implication makes markets tighter, deeper-looking, and more likely to fill.



Tighter markets and better fills

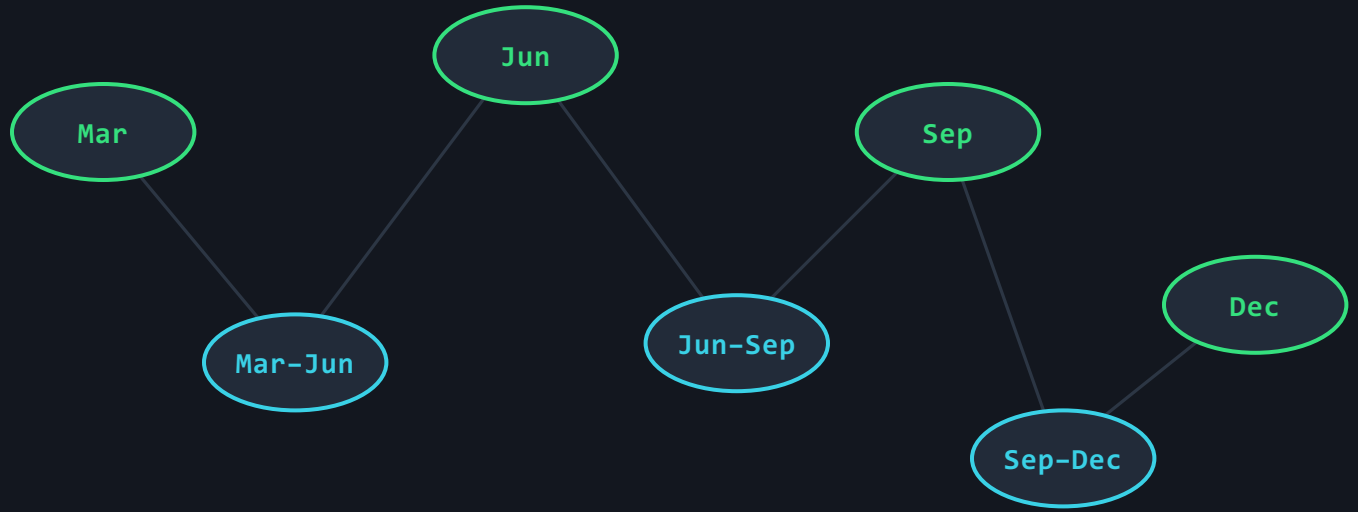
Add implied quotes to a book and the best bid/ask can only stay the same or improve.



Same underlying orders — a 3-wide market becomes 1-wide. Takers pay less to cross.

One trade, a whole web of linked books

In a strip of months, every outright and every spread implies into the others — a connected mesh.



Green = outright · Cyan = spread. A single new leg order can refresh implied prices across many books at once.

THE PAYOFF · 3

Chaining: implied-from-implied

An implied order can itself feed the next implication — a chain across instruments.



Each extra level unlocks prices no single book could show — but also multiplies the work the engine must do. That trade-off is Section VII.

SECTION VI

No liquidity is created

The single most important thing to understand: implication re-expresses liquidity, it never invents it.



NO NEW LIQUIDITY · 1

The big misconception

THE MYTH

“Implied orders conjure extra liquidity out of thin air, so the market is deeper than the real orders justify.”

✖ False.

THE REALITY

Every implied order is just real orders wearing a different label. Trade the implied and you trade the reals — once.

✓ Re-expression, not creation.

Every implied is backed 1:1 by real orders

Peel back any implied quote and you find specific real orders standing behind it.



No hidden inventory. The implied size is capped by the smallest real order behind it (here, 10).

Pull the real order, the implied vanishes

Implied quotes are not stored liquidity — they are live calculations. Remove an input and the output disappears instantly.

BEFORE

March bid 99 × 10 ✓

June ask 98 × 18 ✓

Implied spread bid @ 1

live ✓

AFTER (March bid cancels)

March bid — gone ✖

June ask 98 × 18 ✓

Implied spread bid

vanishes ✖

No double-counting when it trades

The engine guarantees each real order is consumed at most once — whether it's hit directly or through an implied.

March bid 99 can be reached TWO ways:

`directly (someone sells March)` · `or via the implied spread bid`

THE RULE

The moment it fills either way, it is removed from the book — so its liquidity is counted exactly once. Implication reshuffles who trades with whom; it never lets the same order trade twice.

SECTION VII

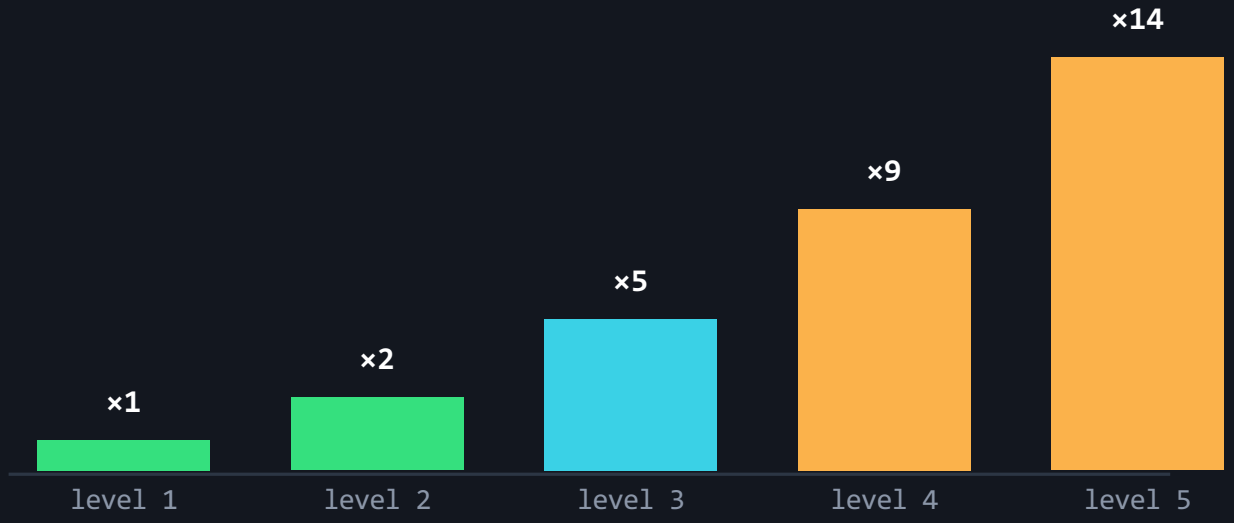
The cost of going deep

Why more levels of implication explode the workload — and why real platforms cap them.



Combinatorial explosion

Each added level of implication multiplies the combinations the engine must compute and keep current.



GROWTH

Combinations rise faster than linearly with depth — quickly into the thousands for a busy strip.

THE LIMIT · 2

What deep implication actually costs

Latency

Every book change can trigger a cascade of re-calculations before the next order is processed.

Compute

Thousands of potential implieds must be generated, priced, and ranked continuously.

Complexity

Deeper chains are harder to audit, risk-check, and reason about when something breaks.

The engine has microseconds. Unbounded implication depth would blow that budget.

Why real platforms cap the levels

THE ENGINEERING CHOICE

Exchanges limit implication to a small number of levels (often 1–2, sometimes a few more) — capturing most of the benefit for a fraction of the cost.



The cap is a deliberate trade-off: near-all the liquidity benefit, bounded and predictable latency.

WRAP-UP

Key takeaways

Implied orders connect books

Synthetic quotes let outright and spread traders reach each other automatically.

IN and OUT are one bridge

Legs imply spreads (IN); spreads + a leg imply outrights (OUT).

No liquidity is created

Every implied is backed 1:1 by real orders and vanishes when they do.

Depth is capped on purpose

Combinatorial cost forces platforms to limit implication levels.

REFERENCE

Quick glossary

Outright

A single instrument, bought or sold on its own.

Spread / combo

One instrument defined as a combination of legs, e.g. March − June.

Best bid / ask

Highest price to sell at / lowest price to buy at.

Implied IN

Spread quote derived from the outright leg books.

Implied OUT

Outright quote derived from a spread order plus a real leg.

Implication depth

How many chained levels of implication the engine allows.

You now have the full picture: what implied orders are, how they're built, why they help, and why they're bounded.