

# EMpulse Street FX Index — Methodology

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<https://empulse.io>

The EMpulse Street FX Index publishes daily "street" exchange rates of emerging-market currencies against USDT (treated as 1 USD): the rate people actually pay, not the official one. The index combines transaction-based market data with quotes from public market sources; each series carries a confidence class, and the limits of the data are published with it.

## Components

component | what it is | where it appears

transaction-  
regates ent  
live table

### The exchange-based component

- Which exchanges. Only exchanges that publish a documented public API for their offers, readable without an

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lows the e  
y 30 days  
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- The hour. Per exchange, currency and side the best offers by price (up to 20) give the best price, the median,

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- Reliability of an exchange (0-1, recomputed daily over 30 days):  $\text{accuracy} = \max(0, 1 - \text{dev} / 5 \%)$ ,  $\text{dev} =$

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- Confidence. A day is high with at least three exchanges within 2 % of each other, medium with at least

three exc  
rule below

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## Coverage and activity

The index of a currency is one number per day, built from the components above:

- when only one component publishes, the index is that component;

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A currency is active when the index has a day within the last 14 days (`/v1/currencies: status = "active"`, `active_since` = the first day of the current run of data without a break longer than 14 days). A currency without a recent day is coverage in progress: we are adding market sources for it, its published history stays available, and it returns to the active list on its own once a recent day exists. The live table of the website shows active currencies only; the number of currencies quoted in the plans is the number of active currencies.

For every active currency the latest day carries:

- sources — the number of independent market sources behind the day (the transaction-based component counts

as one, ev  
or more, a  
in the API

- confidence — the class of the latest day (high / medium / limited, see below); when the day is three

or more d

A currency is published from its first market source on: a day with one source is limited and carries the note coverage improving (website, API, MCP) — the number is real, its uncertainty is stated, and more sources are being added. medium needs two independent sources, high three agreeing within 2 %. The exchange-based component enters the activity rule only once its order books show at least three independent offers in an hour and two days of data; a currency without a single data point stays `coverage_in_progress`.

## Daily index fields (`GET /v1/rates/{cur}``)

- buy — the day's weighted average rate at which a client buys USDT for fiat. A side with too few data

points for

- sell — the same for the side where the client sells USDT.

• mid — (

- side — what mid is based on: both, buy (only buy exists) or sell (only sell exists);

null when  
ead again

- spread\_pct —  $(\text{buy} - \text{sell}) / \text{mid} \times 100$ , only when side = "both"; otherwise null. It is usually

positive; a

- confidence — high, medium or limited. Every currency has a base class from its coverage

(GET /v1/  
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data point

- `in_progress` — true for the latest day of a currency while the day is still being collected and its data point is not yet finalized. It is false for all other days, including the day before the day with a day value.
- `mid_7d` — arithmetic mean of the valid mid values over the last 7 calendar days, including the day itself. It is null if the day is the first day of the month or if the time is less than 7 days since the day was first traded by roughly 1, 7 or 30 days.
- `chg_1d_pct`, `chg_7d_pct`, `chg_30d_pct` —  $(\text{mid} / \text{mid\_N\_days\_ago} - 1) \times 100$ , comparing with exactly the same day N days ago. It is null if the day is the first day of the month or if the time is less than N days since the day was first traded by roughly 1, 7 or 30 days.
- `exchange_spread_pct` (Pro and Enterprise) — the cross-exchange spread of the exchange-based component on the day (see also `exchange_spread_pct`).

"Valid mid" means a non-null mid that is not flagged as an outlier.

### A side that does not move

Sometimes one side of the market stops moving while the other keeps trading at changing prices: over several days (five, for the daily index) its median rate stays within 0.05 %, or every day on that side clears at a single price. Such a price is quoted rather than traded, and a mid halfway between it and the live side would be meaningless. In that case the index is based on the moving side alone: mid equals that side's rate, side names it (buy or sell) although both buy and sell are published, and `spread_pct` is null. The rule is applied day by day and lifts itself as soon as the quiet side starts moving again; when both sides are equally still (a flat market) nothing changes. The hourly index applies the same rule over a window of 24 hours.

### Outliers

A day is flagged `flag = "outlier"` when all of the following hold:

- it has a mid;
- it has fewer than 3 valid mid values in the surrounding window of  $\pm 15$  calendar days, including the day itself.
- its mid deviates by more than 10% from the median mid of the surrounding window of  $\pm 15$  calendar days, including the day itself.
- the window contains at least 3 other days with a mid (otherwise there is not enough data to judge, and the day is not an outlier).

Outlier days keep their own buy, sell, mid and `spread_pct` values so that clients can see them, but they are excluded from `mid_7d` and all `chg_*` calculations (for the outlier day itself and for the days that would reference it).

### Revisions and timing

- Days are UTC calendar days. The current day is incomplete until 00:00 UTC and is revised during the day; it is marked as `in_progress`.
- Because the outlier window looks 15 days forward as well as back, flags (and therefore `mid_7d` and `chg_*`) of the day are not finalized until the day is complete.

- Free API keys receive data up to the previous day; pro and enterprise keys include the current day.

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## Hourly index (`GET /v1/rates/{cur}/hourly`, Pro and Enterprise)

The hourly index is the daily index at hourly granularity: for every UTC hour and currency, buy and sell are the weighted average rates of the hour's market transactions on each side, mid, side and spread\_pct follow the daily rules, and confidence is the currency's base class.

- Hours and sides. A row exists for every hour with market data. A side needs at least \*\*3 data points in the

hour\*\* to  
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- Outliers within the hour. The hour's aggregates are built from transactions within  $\pm 20\%$  of the hour's own

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that does

- Daily summary. Each day of a per-currency response carries vwap (the weighted average rate of the whole

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- In progress. The current UTC hour is in\_progress = true while it is being collected and will be revised;

GET /v1/r

- Timing. Hourly rows arrive with the daily update, which covers the last three days (late transactions and

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## Multi-source street index (`GET /v1/street-index`, product "Street Rate Index — multi-source")

For every currency where public market sources publish street rates — next to the transaction-based series where one exists, on its own where it does not — the index publishes the rate quoted in open sources: exchangers' public Telegram channels, the rates sections of local publishers, forums. A published rate is a fact; we keep the number, the time and the link to the post, never the text.

- Quote — one number from one public post: quoted currency (ISO 4217), base (USD; USDT is counted

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everal citi

- Side convention. side is the client's action, as in the index: a client \*buys\* USD at the

exchange

- Extraction. Regular expressions for the common formats first ("USD 1650/1665", "Покупка: 11810 /

- Plausible range per currency and base: the transaction-based reference of the last 30 days, otherwise

- Source trust (reliability, 0-1, recomputed every day over the last 30 days):

- the shared shift itself is published with the day as  $\text{basis\_gap\_pct} = (\text{multi-source mid} /$

- $\text{*cleanliness*} = 1 - \text{share of outliers}$ ;  $\text{*stability*} = \max(0, 1 - \text{dispersion} / 3 \%)$ ,  $\text{dispersion} = \text{median}$

- $\text{reliability} = 0.5 \cdot \text{accuracy} + 0.2 \cdot \text{cleanliness} + 0.15 \cdot \text{stability} + 0.15 \cdot \text{regularity}$ , within [0.05, 1].

- The day (GET /v1/street-index/{cur}/history): mid = reliability-weighted median of post mids (the

- Access. Free keys: the free-tier currencies with a 1-day delay; Pro: all currencies; Enterprise: all so the

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- Limitations. Posts are what sources chose to publish; a source may be late, wrong or promotional — that

## Currency pages and site statistics

- Each currency has a public page (/rates/{CUR}) with the same 1-day delay as the free tier: the latest day,

- The website keeps first-party visit statistics without cookies or external trackers: page views, countries and

## City boards and exchangers' cards

- A city page (/rates/{CUR}/{city}) shows the country-wide index and, below it, the boards of the exchange

- Every exchanger with a public board gets a card built from that board: the public name of the business, its

- A business claims its card without any human step: a code placed in a file or a meta tag on its site, in a post

- Own rates are shown apart from the index, marked as the exchanger's own. They enter the index only as one more

## Corridors (`GET /v1/corridors/{a}/{b}`, `/corridors/{A}-{B}`, Pro and Enterprise)

Many emerging-market currencies are exchanged against each other directly — som for tenge, hryvnia for dirhams, rupees for riyals — in public forums, channels and classified boards, without a dollar leg. The index reads those public listings in the languages of the countries and publishes the corridor rate of a pair next to the cross rate its own dollar legs imply.

- A listing is one public post that names two non-dollar currencies and a price or two amounts ("куплю суммы за тенге, p the pair e amount and the li d before a a post with very num
  - Plausibility. A listing is checked against the rate implied by the two dollar legs of the index (b per US range is a ndex.
  - The day (rate) is the trust-weighted median of the day's valid listings of the pair, with the day's low and h hree or m g of the p limited.
  - implied\_cross is the same rate computed from the two dollar rates of the index on the same day (each at r ice of goin e cheaper se, and so
  - Currencies without a dollar market. When a currency has no dollar component of its own but is quoted against a = b per U es enters r it came
  - Access. Public pages carry the 24-hour delay of the site; Pro and Enterprise keys get the current day, the histor d only fro ading or n
- ## Limitations
- Street rates reflect what people actually pay on the street market; they are not official, central-bank or interbank
  - Series with confidence = limited have gaps (days without a value or without a mid) and higher noise. Check confidenc
  - Coverage starts at different dates for different currencies (coverage\_since in GET /v1/currencies), and a currenc
  - The index is provided for information purposes only and is not investment advice.