

VEKTOR
BY
INVESTPUPPY

VEKTOR · REFERENCE OUTPUT

SGX Equity Mandate

For DPMs, family office principals, and prospective partners



IP-REF-260611-1.0

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ABOUT THIS DOCUMENT

This document shows what Vektor produces — not slides, not wireframes, not prototypes. Actual platform output, running on Singapore equity market data, following the canonical eleven-step workflow from the first universe screen to funded positions and the first live trade signal cycle.

The mandate used throughout: an SGX equity strategy, ten instruments, benchmarked against the Straits Times Index (STI), funded with SGD 500,000. Every figure, every table, and every screenshot references real output from the Vektor platform running on Yahoo Finance market data. Client names are demonstration data.

Data source: The platform is currently validated using Yahoo Finance. A professional-grade data feed (Bloomberg B-PIPE or equivalent) is required for production and is a defined Proof Partners co-development item. The methodology, construction logic, and allocation precision shown here are independent of the data source choice.

2-level validation	98.94% capital allocation efficiency†	10 instruments selected	SGD 500K mandate size
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† 99.94% is achieved in single-share lot markets (LSE, US equities). The SGX 100-share board lot produces 98.94% for this mandate size and price set. Lot sizes are a configuration parameter — the platform applies the correct rule per exchange automatically. See Step 07.

STEP 01 · SCREEN THE UNIVERSE

Who: Stock Analyst

The analyst uses the SageMaker research workbench to screen SGX-listed equities against three criteria: sector membership (financial services, real estate, industrials), average daily volume above 100,000 shares, and dividend continuity of at least two payments in the preceding three fiscal years.

Sector mapping is done before applying investability constraints so that factor exposures are explicit from the outset. The dividend continuity screen is a quality filter, not a yield screen — companies with consistent dividend histories exhibit lower earnings volatility and more disciplined capital allocation.

Result: A filtered, ranked universe of SGX-listed equities ready for portfolio optimisation. The starting universe of several hundred SGX-listed ordinary equities reduces to a clean, implementation-ready set.

RESEARCH ENVIRONMENT

```

(1): import yfinance as yf
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from datetime import datetime, timedelta
from dateutil.relativedelta import relativedelta
import requests
import os

pd.options.display.float_format = '{:,4f}'.format

Input Parameter

(2): IN_TS_YEAR = 3 # commonly used reporting period
IN_COUNTRY = 'SGP' # SGP or USA
IN_STOCK_CNT = 10 # total selected stocks

match IN_COUNTRY:
    case 'SGP':
        web_url = 'https://stockanalysis.com/list/singapore-exchange/'
        yf_currency = 'SGD'
        yf_exchange = ['SGX'] # SGX
        yf_suffix = '.SI' # Yahoo Finance suffix for Singapore
        market_region = 'SGX' # For portfolio-strat API
        yf_sectors = ['financial-services', 'real-estate', 'industrials']
        index_etf = 'ES3.SI' # Strait Time Index (STI) -> ES3
        rfr_country = 'SGP' # Risk-free rate country
        rfr_tenor = '18Y' # Risk-free rate tenor
    case 'USA':
        web_url = 'https://stockanalysis.com/list/sp-500-stocks/'
        yf_currency = 'USD'
        yf_exchange = ['NYSE', 'NYSE']
        yf_suffix = '' # No suffix for US stocks
        market_region = 'NASDAQ' # For portfolio-strat API
        yf_sectors = ['financial-services', 'technology']
        index_etf = 'SPY' # S&P 500 -> SPY
        rfr_country = 'USA' # Risk-free rate country
        rfr_tenor = '18Y' # Risk-free rate tenor

Market Data

(3): web_ex_df = pd.read_html(web_url)[0]
web_ex_df.set_index('Symbol', inplace=True)

if IN_COUNTRY == 'SGP':
    web_ex_df.index = web_ex_df.index.map(lambda x: f'{x}.SI')

web_ex_df.info()

```

Step 01 · SageMaker research workbench. Market parameters configured for SGX: sectors, liquidity filters, benchmark index (STI), risk-free rate (Singapore 3-month T-bill). Python notebook environment.

STEP 02 · OPTIMISE THE PORTFOLIO

Who: Stock Analyst (automated via platform)

The optimisation engine computes expected returns via CAPM and the covariance matrix via Ledoit-Wolf shrinkage from the screened universe, then solves directly to the maximum-Sharpe portfolio — a deterministic quadratic program, not a sampled search.

Mathematical process:

- Expected returns via CAPM: $E(R_i) = R_f + \beta_i(E(R_m) - R_f)$
- Covariance via Ledoit-Wolf shrinkage: $\Sigma = \delta F + (1-\delta)S$ — the sample covariance S shrunk toward a structured target F . Deterministic solve for the maximum-Sharpe portfolio: maximise $(w^T E(R) - R_f) / \sqrt{(w^T \Sigma w)}$, subject to $\Sigma w = 1, w \geq 0$
- Tracking portfolio returns: $R(\text{portfolio}, t) = \Sigma w(i, t-1) \times R(i, t)$
- Active returns: $R(\text{active}, t) = R(\text{portfolio}, t) - R(\text{index}, t)$
- Annualised tracking error: $TE = \sigma(R_{\text{active}}) \times \sqrt{252}$

The frontier is traced by solving this same deterministic optimisation at a range of target return levels; the maximum-Sharpe point is identified analytically from within the resulting curve — not sampled or approximated.

On the 45.0% — read this before you quote it.

The number is doing exactly what an optimised backtest does. Three mechanisms inflate it:

- **In-sample parameters** — every indicator's parameters were chosen by grid search on the same three-year window they are scored against; this flatters historical performance by construction.
- **In-sample weights** — the max-Sharpe solve then picks the weightings that performed best over that same window.
- **No trading friction** — the backtest excludes transaction costs, market impact, and execution slippage.

What to take from it: a live Sharpe of 50–70% of the backtest's 3.09 is a reasonable expectation for a well-constructed systematic strategy, and the 45.0% return should be read with at least the same discount. Neither figure is a guarantee; the live track record begins with the first Proof Partner. Full framework: WP-10 — Evaluating Systematic Strategy Performance.

PLATFORM INTERFACE

Launcher

instrument-selection-analy x

xgbboost-price-prediction.jg x

Notebook Cluster Python 3 (ipykernel)

Target Optimization Logic

The tracking optimization algorithm aims to find the optimal subset of stocks that best replicates the performance of our price-weighted index (PWI) with minimal tracking error.

Mathematical Formula

For each simulation iteration, we:

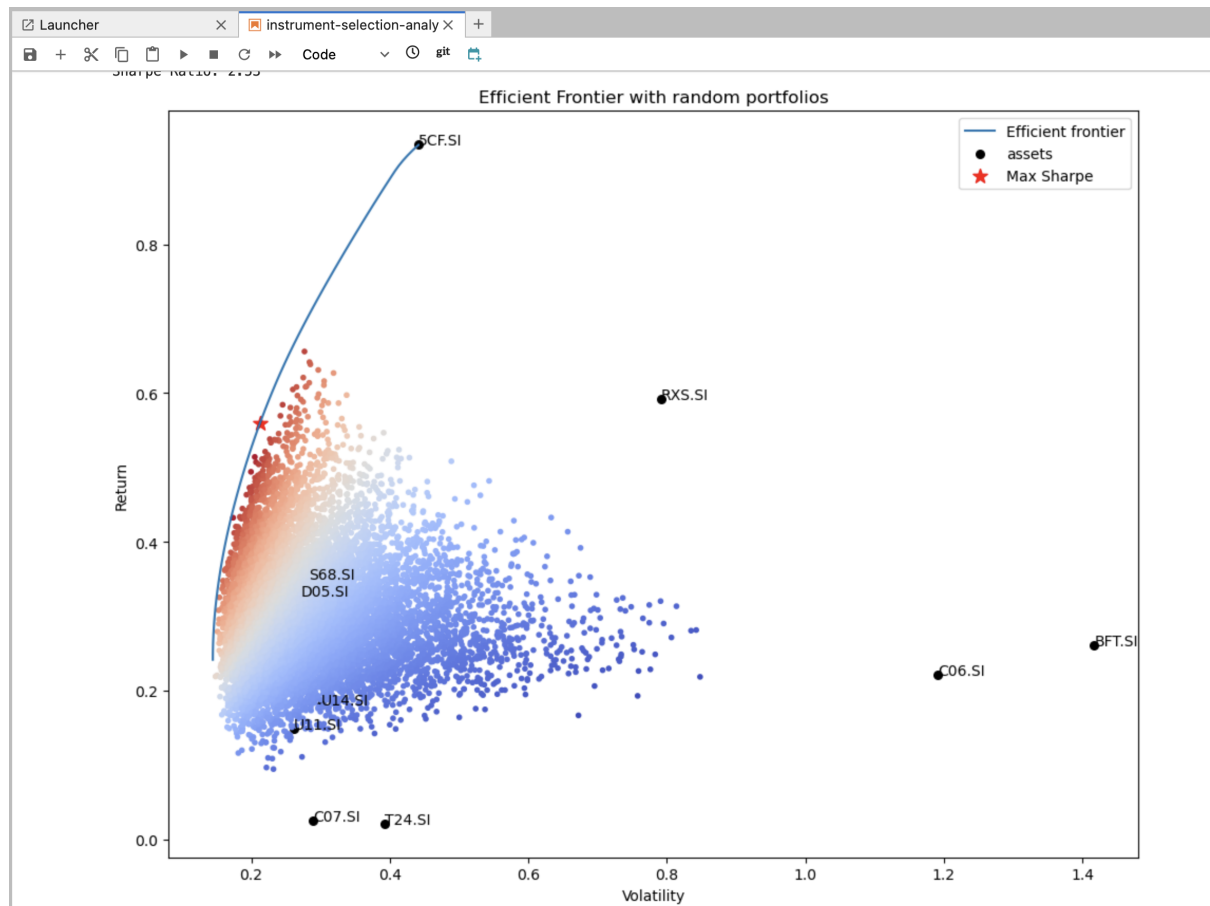
- Random Selection:** Randomly select n stocks from the universe of N dividend-paying stocks
- Weight Calculation:** Calculate price-weighted portfolio weights at time t :
$$w_{j,t} = \frac{P_{j,t}}{\sum_{j=1}^n P_{j,t}}$$
- Portfolio Returns:** Calculate tracking portfolio returns:
$$R_{portfolio,t} = \sum_{i=1}^n w_{i,t-1} \times R_{i,t}$$
- Active Returns:** Compute active returns against the benchmark:
$$R_{active,t} = R_{portfolio,t} - R_{index,t}$$
- Tracking Error:** Calculate annualized tracking error:
$$TE = \sigma(R_{active}) \times \sqrt{252}$$
- Information Ratio** (optional): Measure risk-adjusted active return:
$$IR = \frac{R_{active}}{TE}$$

The algorithm runs **10,000 simulations** to find the combination with the lowest tracking error, ensuring optimal index replication with the selected number of stocks. This approach follows industry standards used by major index fund providers like Vanguard and BlackRock.

```
[*]: # Tracking optimization
const = div_sym_to_list()
n = len(const)
l = INL_STOCK_CNT
sims = 10000
```

Step 02 · Target optimisation logic. Algorithm solves directly to the maximum-Sharpe portfolio — deterministic, not sampled. Mathematical formulae for weight calculation, portfolio returns, active returns, tracking error, and information ratio fully documented and reproducible.

PLATFORM INTERFACE



Step 02 · Efficient frontier — SGX equity mandate. Each point is a deterministic solve at a target return level, not a simulated portfolio. Red = high Sharpe, blue = low Sharpe. Star marks the max-Sharpe selection. X-axis: volatility. Y-axis: return.

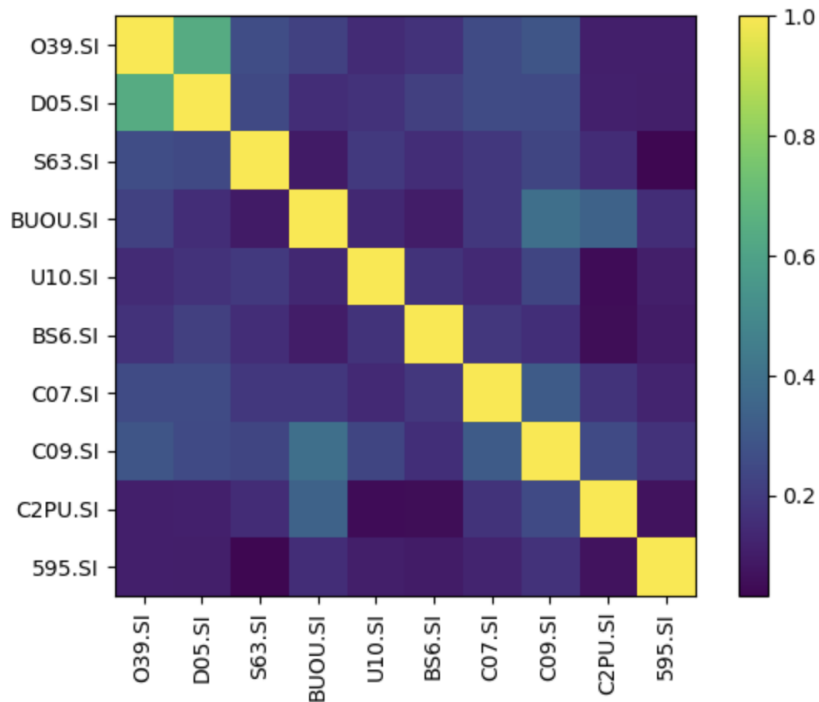
STEP 03 · VALIDATE DIVERSIFICATION

Who: Stock Analyst

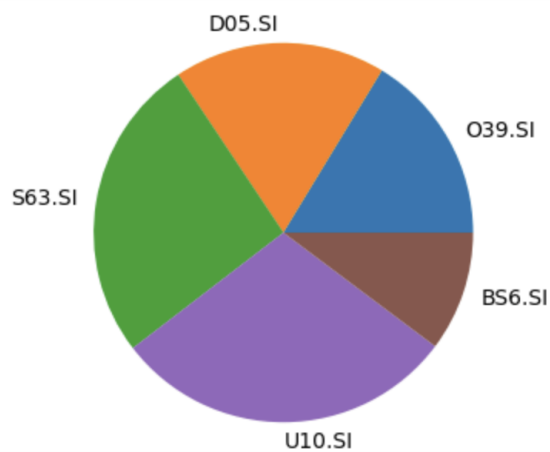
Strategy weights are validated against the STI benchmark on two criteria: sector coverage (at least one instrument from each of the three primary sectors) and annualised tracking error below 8%. A full correlation matrix then confirms genuine diversification.

A portfolio spread across ten names but correlated in price behaviour is not diversified — it is concentrated risk with the appearance of breadth. The heatmap makes this visible before any strategy proceeds to portfolio manager review. Diagonal yellows confirm self-correlation (1.0); off-diagonal dark values confirm genuine independence of price movement.

PLATFORM INTERFACE



```
[21]: pd.Series(weights).plot.pie(figsize=(4, 4))
```



Step 03 · Correlation heatmap — SGX 10-stock portfolio. Off-diagonal values close to zero (dark blue) confirm genuine diversification. High off-diagonal values would flag co-movement risk before PM approval.

PLATFORM INTERFACE

SGP Equity Strategy

sgp - stocks

Market Region: **SGX** | Currency: **SGD** | Max Instruments: **10** | Selected: **10 instruments** | Total Weight: **NaN%** | Created: **5/10/2026**

Description: Dividend-paying stocks from financial-services, real-estate, industrials sectors

Selected Instruments

Symbol	Name	Score	Weight	Indicator	Optimized	Selected
C2PU	Parkway Life Real Estate Investment Trust	10	0.0%	RS	YES	5/10/2026
S63	Singapore Technologies Engineering Ltd	10	26.1%	EMA	YES	5/10/2026
C09	City Developments Limited	10	0.0%	MACD	YES	5/10/2026
S95	GKE Corporation Limited	10	0.0%	RS	YES	5/10/2026
U10	UOB-Kay Hian Holdings Limited	10	29.3%	SMA	YES	5/10/2026
BUOU	Frasers Logistics & Commercial Trust	10	0.0%	MACD	YES	5/10/2026
C07	Jardine Cycle & Carriage Limited	10	0.0%	SMA	YES	5/10/2026
D05	DBS Group Holdings Ltd	10	18.0%	MACD	YES	5/10/2026
O39	Oversea-Chinese Banking Corporation Limited	10	16.3%	EMA	YES	5/10/2026
BS6	Yangzijiang Shipbuilding (Holdings) Ltd.	10	10.2%	RS	YES	5/10/2026

Selection Criteria

Step 03 · Portfolio weight distribution. Five active instruments (non-zero weight): U10 29.35%, S63 26.07%, D05 18.04%, O39 16.31%, BS6 10.23%.

SGX Equity Strategy — Final Instrument Weights

Symbol	Company	Sector	Weight	Indicator
U10	UOB-Kay Hian Holdings Limited	Financial Services	29.35%	EMA
S63	Singapore Technologies Engineering	Industrials	26.07%	EMA
D05	DBS Group Holdings Ltd	Financial Services	18.04%	MACD
O39	Oversea-Chinese Banking Corporation	Financial Services	16.31%	EMA
BS6	Yangzijiang Shipbuilding (Holdings)	Industrials	10.23%	BB
C2PU	Parkway Life REIT	Real Estate	0.0% †	—
C09	City Developments Limited	Real Estate	0.0% †	—
C07	Jardine Cycle & Carriage Limited	Industrials	0.0% †	—
S95	GKE Corporation Limited	Industrials	0.0% †	—
BUOU	Frasers Logistics & Commercial Trust	Real Estate	0.0% †	—

† Instruments in the universe assigned zero weight by the optimisation. Retained in the strategy record as a benchmark-aware reserve for potential rebalancing.

STEP 04 · PER-STOCK SIGNAL SELECTION

Who: Automated (AWS Step Function) · Stock Analyst (ML training)

PLATFORM INTERFACE

XGBoost Price Direction Prediction

Train and deploy a SageMaker XGBoost model to predict stock price direction (UP/DOWN). Used by `ml_validator.py` in the trade-signal service for ML-based trade validation.

Feature Alignment

This notebook trains with the same 11 features that `ml_validator.py` sends at inference:

1. `returns` - daily close pct change
2. `high_low_ratio` - high/low
3. `close_open_ratio` - close/open
4. `price_sma5_ratio` - close/SMA(5)
5. `price_sma20_ratio` - close/SMA(20)
6. `rsi` - RSI(14)
7. `volatility_10` - 10-day rolling std of returns
8. `volatility_20` - 20-day rolling std of returns
9. `momentum_5` - 5-day return percentage
10. `momentum_10` - 10-day return percentage
11. `volume_ratio` - volume/SMA(volume,10)

```
[1]: import sys
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
import boto3
import json
```

Step 04 has two components that run in sequence: automated per-instrument indicator selection via grid search, followed by ML model training and deployment to validate live signals at each subsequent trade cycle.

PART A — Technical Indicator Grid Search

Vektor runs a full grid search across six indicators for every instrument, backtesting all parameter combinations against three years of daily price data. The configuration with the highest annualised Sharpe ratio is selected and saved to the strategy record — visible to the portfolio manager at Step 05 review.

Abbrev	Indicator	What it detects	Optimised parameter ranges
SMA	Simple Moving Average	Trend-following	Short: 10–30 days · Long: 40–80 days
EMA	Exponential Moving Average	Trend with recency weighting	Short: 10–30 days · Long: 40–80 days
MACD	MACD	Momentum (EMA convergence)	Short: 5–20 · Long: 20–50 · Signal: 5–15
BB	Bollinger Bands	Volatility breakout	SMA: 10–30 · Std dev: 1–3
RSI	Relative Strength Index	Overbought / oversold	Period: 10–20 · Upper: 60–80 · Lower: 20–40
SO	Stochastic Oscillator	Mean reversion	Period: 10–20 · %D smoothing: 2–5

Grid search result — selected indicator per active instrument:

Symbol	Company	Selected Indicator	Status
U10	UOB-Kay Hian Holdings	EMA	Optimised · Validated
S63	Singapore Technologies Engineering	EMA	Optimised · Validated
D05	DBS Group Holdings	MACD	Optimised · Validated
O39	OCBC	EMA	Optimised · Validated
BS6	Yangzijiang Shipbuilding	BB	Optimised · Validated

PART B — XGBoost ML Model Training and Deployment

The XGBoost model provides an independent second assessment of every signal before execution, trained on 11 features derived from three years of daily price data, versioned and deployed via SageMaker. Each new version requires an explicit promotion step before replacing the production endpoint — training data window, feature set, and validation results are stored in the strategy record.

TECHNICAL DETAIL — XGBOOST INPUT FEATURES

Feature	Description
returns	Daily close price percentage change
high_low_ratio	High / low price ratio
close_open_ratio	Close / open price ratio
price_sma5_ratio	Close / SMA(5)
price_sma20_ratio	Close / SMA(20)
rsi	RSI(14)
volatility_10	10-day rolling standard deviation of returns
volatility_20	20-day rolling standard deviation of returns
momentum_5	5-day return percentage
momentum_10	10-day return percentage
volume_ratio	Volume / SMA(volume, 10)

The same 11 features are calculated from current market data at each daily inference call, ensuring training and production inference use identical inputs.

PLATFORM INTERFACE

Launcher | instrument-selection-analy | xgboost-price-prediction.ipynb | Notebook | Cluster | Python 3 (pykernel)

XGBoost Price Direction Prediction

Train and deploy a SageMaker XGBoost model to predict stock price direction (UP/DOWN). Used by `ml_validator.py` in the trade-signal service for ML-based trade validation.

Feature Alignment

This notebook trains with the same 11 features that `ml_validator.py` sends at inference:

1. `returns` - daily close pct_change
2. `high_low_ratio` - high/low
3. `close_open_ratio` - close/open
4. `price_sma5_ratio` - close/SMA(5)
5. `price_sma20_ratio` - close/SMA(20)
6. `rsi` - RSI(14)
7. `volatility_10` - 10-day rolling std of returns
8. `volatility_20` - 20-day rolling std of returns
9. `momentum_5` - 5-day return percentage
10. `momentum_10` - 10-day return percentage
11. `volume_ratio` - volume/SMA(volume,10)

```
[1]: import sys
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
import boto3
import json
```

Step 04 · XGBoost model training — SageMaker. Feature alignment confirmation: notebook trains with same 11 features that `ml_validator.py` sends at inference. Training target: stock price direction (UP/DOWN) in next trading session.

STEP 05 · STRATEGY REVIEW

Who: Portfolio Manager

The portfolio manager opens the admin portal and reviews the complete strategy before any client assignment proceeds. This is a mandatory human gate — no position can be assigned to a client before this approval record exists.

The review surface shows: strategy name and description, all selected instruments with allocation weights, the technical indicator assigned to each instrument, and the backtest Sharpe ratio. Instruments with non-zero weights are highlighted as active in the portfolio.

Result: Strategy validated and approved. Every instrument, weight, indicator, and backtest Sharpe ratio visible to the PM before sign-off. Approval logged with PM identity and timestamp.

PLATFORM INTERFACE

SGP Equity Strategy
sgp-stocks

Market Region: **SGX** | Currency: **SGD** | Max Instruments: **10** | Selected: **10 instruments** | Total Weight: **NaN%** | Created: **5/10/2026**

Description: Dividend-paying stocks from financial-services, real-estate, industrials sectors

Selected Instruments

Symbol	Name	Score	Weight	Indicator	Optimized	Selected
C2PU	Parkway Life Real Estate Investment Trust	10	0.0%	RSI	YES	5/10/2026
S63	Singapore Technologies Engineering Ltd	10	26.1%	EMA	YES	5/10/2026
C89	City Developments Limited	10	0.0%	MACD	YES	5/10/2026
S95	GKE Corporation Limited	10	0.0%	RSI	YES	5/10/2026
U18	UOB-Kay Hian Holdings Limited	10	29.3%	SMA	YES	5/10/2026
B00U	Fraser's Logistics & Commercial Trust	10	0.0%	MACD	YES	5/10/2026
C87	Jardine Cycle & Carriage Limited	10	0.0%	SMA	YES	5/10/2026
D85	DBS Group Holdings Ltd	10	18.0%	MACD	YES	5/10/2026
O39	Oversea-Chinese Banking Corporation Limited	10	16.3%	EMA	YES	5/10/2026
B56	Yangzijiang Shipbuilding (Holdings) Ltd.	10	10.2%	RSI	YES	5/10/2026

Selection Criteria

Step 05 · SGP Equity Strategy — admin portal. 10 instruments with allocation weights, assigned indicators (BB, MACD, SMA, EMA, RSI), optimisation status, and selection date. All instruments validated and ready for client assignment.

STEP 06 · CLIENT ONBOARDING

Who: Portfolio Manager

From the admin portal the portfolio manager completes two actions: Create Client (name, type, risk profile, base currency) and Create Portfolio (linked to client, assigned strategy, configured capital). Both actions are logged with PM identity and timestamp.

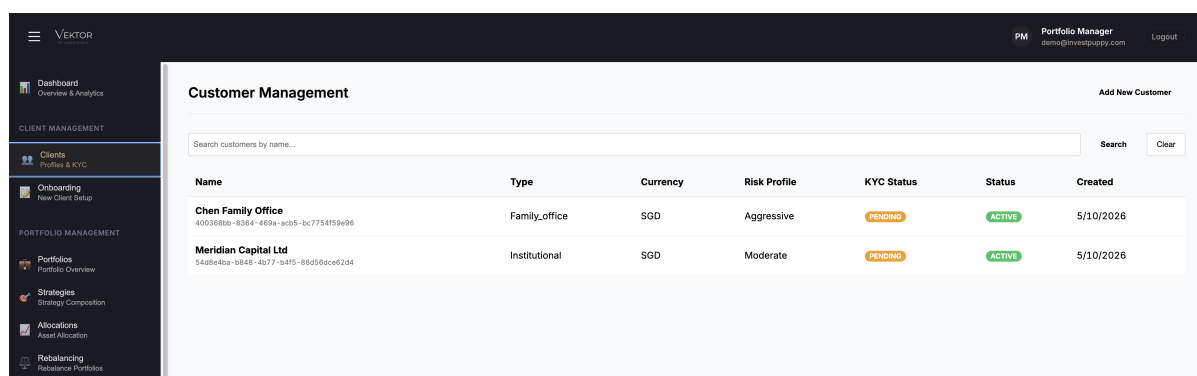
Result: Client profile and portfolio created. This document follows the Chen Family Office mandate (SGD 500,000 · Aggressive · Family Office) through Steps 07–11. A second portfolio — Meridian Capital Ltd (SGD 300,000 · Moderate · Institutional) — was created in the same session; its allocation output follows the

same process and is not separately illustrated here.

Client names shown are demonstration data used for illustration purposes.

KYC Status is a PM-managed tracking field reflecting the DPM's own client onboarding process. No KYC documentation is uploaded to or retained by the Vektor platform.

PLATFORM INTERFACE



Name	Type	Currency	Risk Profile	KYC Status	Status	Created
Chen Family Office 40036880-8364-489a-ac35-bc7754f59a96	Family_office	SGD	Aggressive	PENDING	ACTIVE	5/10/2026
Meridian Capital Ltd 54d8e40a-0848-4677-b4f5-88d5dce62d4	Institutional	SGD	Moderate	PENDING	ACTIVE	5/10/2026

Step 06 · Customer Management — admin portal. Chen Family Office (Family_Office, SGD, Aggressive, KYC Pending, Active) and Meridian Capital Ltd (Institutional, SGD, Moderate, KYC Pending, Active). Created 5/10/2026. (Demonstration data.)

Data residency:

Client identifying data residency — including hybrid identity vault configuration for Swiss and other data-sensitive markets — is described in the Three Delivery Models document. See also WP-07: Production Infrastructure.

STEP 07 · ASSET ALLOCATION

Who: Portfolio Manager

Workflow note:

Steps 07 (Asset Allocation) and 09 (Cash Funding) may occur in either sequence depending on the DPM's practice workflow. The allocation calculation is independent of cash confirmation. The allocation becomes executable once cash is confirmed at Step 09. Both sequences are valid; both create a complete audit trail.

The allocation engine fetches live market prices at the moment of calculation, applies floor rounding to the nearest 100-share lot, and reserves a configurable cash buffer. Lot sizes are a configuration parameter per exchange — not hard-coded — so the same allocation engine runs correctly on SGX (100 shares), LSE (1 share), US equities (1 share), or any other configured market.

PLATFORM INTERFACE

Step 07 · Asset Allocation — platform interface. Total Capital: SGD 500,000. Available Capital: SGD 475,000. Total Allocated: SGD 469,948. Cash Remaining: SGD 30,052. Efficiency: 98.94%. 5 active / 10 total instruments.

Allocation Breakdown — Chen SGP Growth — SGD 500,000 Mandate

Symbol	Company	Weight	Price (SGD)	Shares	Amount (SGD)
U10	UOB-Kay Hian Holdings	29.35%	4.20	33,100	139,020.00
S63	Singapore Tech Engineering	26.07%	10.66	11,600	123,656.00
D05	DBS Group Holdings	18.04%	58.68	1,400	82,152.00
O39	OCBC	16.31%	21.92	3,500	76,720.00
BS6	Yangzijiang Shipbuilding	10.23%	4.00	12,100	48,400.00
Total		100.00%			469,948.00

Allocation efficiency 98.94% reflects SGX 100-share board lot rounding on this mandate size and price set. In single-share lot markets (LSE, US equities) allocation efficiency consistently exceeds 99.94%.

STEP 08 · ORDER GENERATION

Who: Portfolio Manager · System (automated trade workflow)

Approved signals from the daily automated trade workflow are converted to orders and dispatched to the SQS queue for submission to the IBKR Gateway. Every order carries a complete lifecycle record and a correlation ID linking it back to the signal generation event.

The trade workflow runs daily. Strategy rebuild (full re-optimisation) is triggered by the portfolio manager. Signal re-validation against the deployed XGBoost model runs automatically each day.

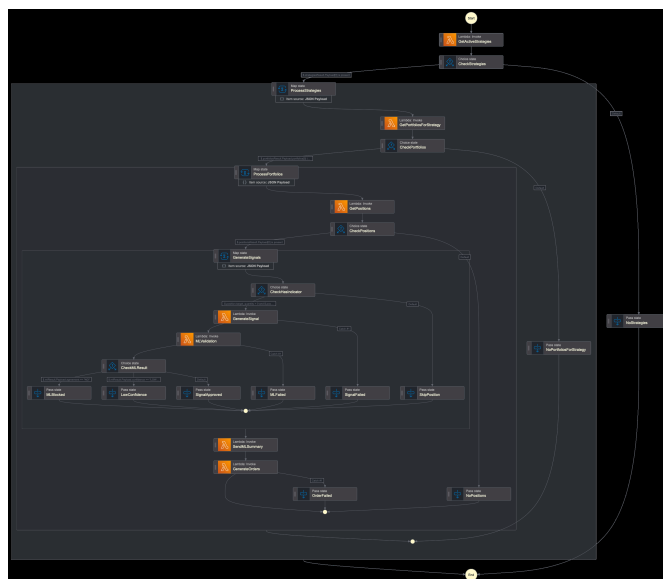
The daily AWS Step Function executes: Get Active Strategies → Get Portfolios → Get Positions → Generate Signals (BUY/SELL/HOLD) → ML Validation (Approved / ML Blocked / Low Confidence) → Send Notification → Create Orders.

Example signal cycle output — Chen SGP Growth portfolio:

Symbol	TI Signal	ML Outcome	Interpretation
BS6	HOLD	■ Approved (HIGH)	Indicator and ML agree. Order created.
U10	BUY	■ ML Blocked	TI says BUY; ML predicts DOWN. No order. Capital protected.
S63	BUY	■ ML Blocked	TI says BUY; ML predicts DOWN. No order. Capital protected.
O39	BUY	■ ML Blocked	TI says BUY; ML predicts DOWN. No order. Capital protected.
D05	BUY	■ Low Confidence (0.5273)	Order created with caution flag. PM awareness signal.

Of 5 signals generated, 3 were blocked because the ML model detected conditions inconsistent with a profitable buy. Without ML validation, 3 buy orders would have been submitted against a predicted price decline.

PLATFORM INTERFACE



Step 08 · AWS Step Function — automated trade execution pipeline. Lambda nodes: *GetActiveStrategies*, *GetPortfoliosForStrategy*, *GetPositions*, *GenerateSignal*, *MLValidation*, *GenerateMLSummary*, *GenerateOrders*. Choice states for each signal outcome.

PLATFORM INTERFACE

The screenshot shows a Slack interface for 'InvestPuppy'. The left sidebar contains navigation options: Home, DMs, Activity, Files, More, and Admin. The main channel is '# trading-signals'. A message from 'InvestPuppy Trading Bot' is displayed, containing a 'Trade Signal Summary' for Portfolio: 0d8ca5bd... The message includes a status bar: 'Approved: 1 | ML Blocked: 3 | Low Confidence: 1'. Below this, it lists 'Approved Signals' (BS6: HOLD (HIGH)), 'Blocked by ML' (U10: TI=BUY vs ML=DOWN, S63: TI=BUY vs ML=DOWN, O39: TI=BUY vs ML=DOWN), and 'Low Confidence' (D05: WEAK_BUY (prob=0.5273)).

Step 08 · Slack trade signal notification — #trading-signals channel. Portfolio 0d8ca5bd. Approved: 1 · ML Blocked: 3 · Low Confidence: 1. Approved: BS6 HOLD (HIGH). Blocked: U10, S63, O39 (TI=BUY vs ML=DOWN). Low Confidence: D05 WEAK_BUY (prob=0.5273).

PLATFORM INTERFACE

The screenshot shows the 'Order Management' interface in the Vektor platform. The left sidebar contains navigation options: Dashboard, Client Management, Portfolio Management, and Trading & Orders. The main section is 'Order Management' with tabs for 'Order History', 'Order Detail', and 'Create Order'. The 'Order History' tab is active, showing a table of orders. The table has columns: Symbol, Side, Quantity, Status, Created, and Updated. Two orders are listed: D05 BUY 1,400 shares (QUEUED) and D05 BUY 900 shares (QUEUED). The status lifecycle is noted as: CREATED → QUEUED → SENT → FILLED.

Symbol	Side	Quantity	Status	Created	Updated
D05	BUY	1,400	QUEUED	5/10/2026, 11:38:12 PM	5/10/2026, 11:38:12 PM
D05	BUY	900	QUEUED	5/10/2026, 11:38:12 PM	5/10/2026, 11:38:12 PM

Step 08 · Order Management — Order List. D05: BUY 1,400 shares · QUEUED. D05: BUY 900 shares · QUEUED. Status lifecycle: CREATED → QUEUED → SENT → FILLED.

PLATFORM INTERFACE

The screenshot shows the 'Order Management' section of the Vektor platform. The left sidebar contains navigation links for Dashboard, Client Management, Portfolio Management, and Trading & Orders. The main content area displays the 'Order History' table. The table has columns for Symbol, Side, Quantity, Status, Created, and Updated. Two orders are listed: D05 BUY 1,400 QUEUED and D05 BUY 900 QUEUED. The status 'QUEUED' is highlighted in blue. The page shows 'Page 1 of 1 (2 total)' and includes 'Previous' and 'Next' buttons.

Symbol	Side	Quantity	Status	Created	Updated
D05	BUY	1,400	QUEUED	5/10/2026, 11:38:12 PM	5/10/2026, 11:38:12 PM
D05	BUY	900	QUEUED	5/10/2026, 11:38:12 PM	5/10/2026, 11:38:12 PM

Step 08 · Order Detail — D05 BUY 1,400 · QUEUED. Order ID, Portfolio ID, Customer ID, Symbol (D05), Side (BUY), Quantity (1,400), Status (QUEUED). Lifecycle: CREATED 5/10/2026 11:38:12 PM → QUEUED. SQS message ID for full traceability.

STEP 09 · CASH FUNDING

Who: Operations

Operations records the client's wire transfer deposit: currency, amount, and wire reference. The deposit record creates an immutable audit trail entry — logged with Operations user identity and timestamp. Operations cannot create strategies or approve allocations; this separation ensures the person controlling cash movements is independent of the investment decision chain.

Result: Chen SGP Growth: SGD 500,000 deposit recorded. Cash account funded. Full audit trail entry created. Allocation (Step 07) becomes executable from this point.

PLATFORM INTERFACE

The screenshot shows the 'Cash Movements' section of the Vektor platform. The left sidebar is the same as in Step 08. The main content area displays the 'Cash Movements' table for 'Chen SGP Growth'. The table has columns for Date, Type, Amount, and Reference. A single entry is shown: 5/10/2026, DEPOSIT, +500,000.00, -. The total capital is displayed as SGD 500,000.00. The strategy is 'sgp-stocks' and the risk is 'aggressive'.

Date	Type	Amount	Reference
5/10/2026	DEPOSIT	+500,000.00	-

Step 09 · Cash Movements — Chen SGP Growth. Date: 5/10/2026. Type: DEPOSIT. Amount: +500,000.00. Total Capital: SGD 500,000. Strategy: sgp-stocks. Risk: Aggressive.

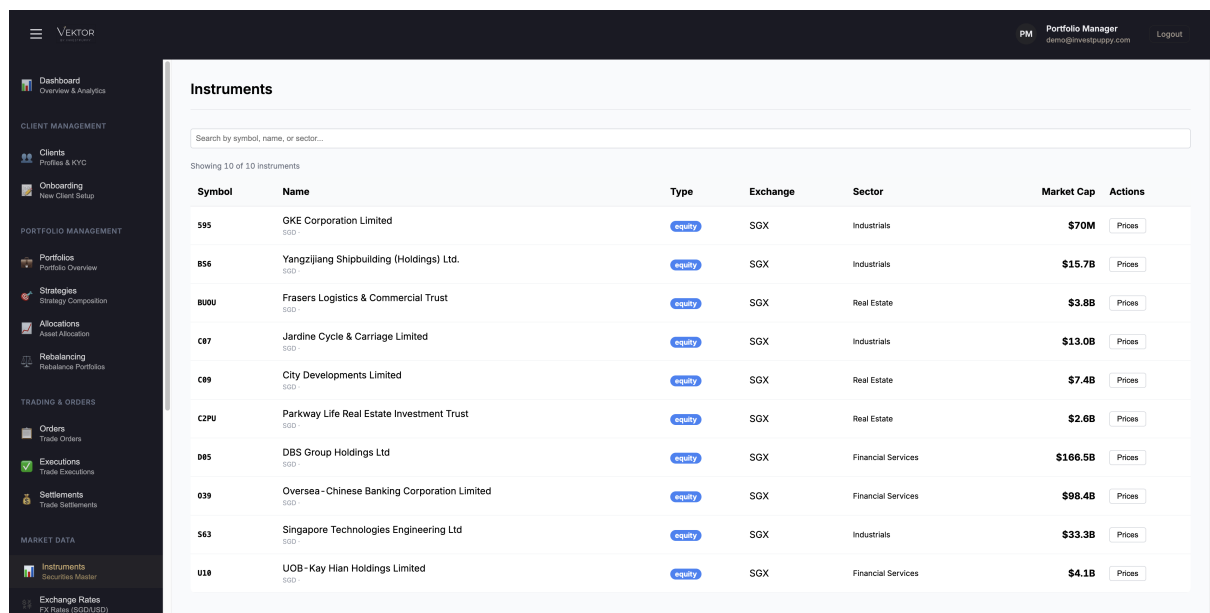
STEP 10 · MARKET DATA REFRESH

Who: System (automated · daily at 8 AM SGT)

Every market day at 8 AM SGT the platform automatically refreshes equity price history (three years of daily OHLCV data for all configured instruments) and foreign exchange rates (all currency pairs required by configured mandates). As of this reference run: 10 instruments registered, 3 years of daily price history per instrument, FX rates for SGD/USD and all configured pairs.

If the daily price download fails, existing price history is unaffected. New strategy builds or signal re-optimisations are deferred until the feed is restored. A Slack notification on download completion means failures are visible immediately.

PLATFORM INTERFACE



The screenshot displays the Vektor Platform Interface. On the left is a dark sidebar with navigation links: Dashboard, CLIENT MANAGEMENT (Clients, Onboarding), PORTFOLIO MANAGEMENT (Portfolios, Strategies, Allocations, Rebalancing), TRADING & ORDERS (Orders, Executions, Settlements), and MARKET DATA (Instruments, Exchange Rates). The main content area is titled 'Instruments' and features a search bar. Below the search bar, it says 'Showing 10 of 10 instruments'. A table lists 10 instruments with columns for Symbol, Name, Type, Exchange, Sector, Market Cap, and Actions. Each instrument has a 'Prices' button next to its market cap.

Symbol	Name	Type	Exchange	Sector	Market Cap	Actions
S95	GKE Corporation Limited SGD	equity	SGX	Industrials	\$70M	Prices
B56	Yangzijiang Shipbuilding (Holdings) Ltd. SGD	equity	SGX	Industrials	\$15.7B	Prices
B10U	Fraser Logistics & Commercial Trust SGD	equity	SGX	Real Estate	\$3.8B	Prices
C87	Jardine Cycle & Carriage Limited SGD	equity	SGX	Industrials	\$13.0B	Prices
C89	City Developments Limited SGD	equity	SGX	Real Estate	\$7.4B	Prices
C2PU	Parkway Life Real Estate Investment Trust SGD	equity	SGX	Real Estate	\$2.6B	Prices
D05	DBS Group Holdings Ltd SGD	equity	SGX	Financial Services	\$166.5B	Prices
O39	Oversea-Chinese Banking Corporation Limited SGD	equity	SGX	Financial Services	\$98.4B	Prices
S63	Singapore Technologies Engineering Ltd SGD	equity	SGX	Industrials	\$33.3B	Prices
U18	UOB-Kay Hian Holdings Limited SGD	equity	SGX	Financial Services	\$4.1B	Prices

Step 10 · Instruments Master — Market Data. All 10 registered securities: symbol, company name, exchange (SGX), type (equity), sector, market cap. GKE Corporation (S95): Industrials, \$70M. DBS Group (D05): Financial Services, \$166.5B.

PLATFORM INTERFACE

5CF — OKP Holdings Limited					
Type	Exchange	Currency	Country	Sector	Market Cap
equity	SGX	SGD		Industrials	\$430M

Price History (Last 30 Days)				
Date	Open	High	Low	Close
3/31/2026	0.6650	0.6650	0.6350	0.6400
4/1/2026	0.6600	0.7000	0.6500	0.6900
4/2/2026	0.7000	0.7250	0.6850	0.6900
4/6/2026	0.7000	0.7200	0.6850	0.7150
4/7/2026	0.7050	0.7200	0.6950	0.7050
4/8/2026	0.7250	0.7400	0.7150	0.7250
4/9/2026	0.7250	0.7400	0.7100	0.7150
4/10/2026	0.7150	0.7400	0.7150	0.7150
4/13/2026	0.7300	0.7300	0.7000	0.7100
4/14/2026	0.7100	0.7300	0.7050	0.7250
4/15/2026	0.7250	0.7500	0.7250	0.7350
4/16/2026	0.7350	0.7700	0.7350	0.7600

Step 10 · Price History — GKE Corporation (S95). Exchange: SGX. Currency: SGD. Sector: Industrials. Market Cap: \$70M. Price History (Last 30 Days): daily open, high, low, close, volume. Close range: 0.0750–0.0810 over the period shown.

STEP 11 · AUDIT & FX RATES

Who: System (continuous logging) · Operations (review)

Every capital-affecting action across all eleven workflow steps is logged automatically as a by-product of normal platform operation. The audit trail is not maintained separately — it is the platform's operational record. No separate compliance documentation process is required.

What is logged at each stage:

- Strategy creation: Analyst ID, strategy name, universe specification, screening parameters, optimisation result, per-instrument signal assignments, backtest Sharpe ratios. Timestamp.
- Strategy approval: PM ID, strategy ID, approval status, review timestamp.
- Strategy modification: any change to an approved strategy requires PM re-approval, creating a new approval record. The original approval is retained in the audit trail.
- Client and portfolio creation: PM ID, client details, portfolio configuration. Timestamp.
- Allocation calculation: PM ID, portfolio ID, live prices fetched, weight-to-share calculations, lot size rounding applied, cash buffer reserved, efficiency percentage. Timestamp.
- Cash deposit: Operations ID, portfolio ID, currency, amount, wire reference, resulting balance. Timestamp.
- Market data refresh: instrument count, price history extension, FX rates updated. Automated timestamp.

– Order generation: signal source (indicator + ML outcome), order details, SQS message ID, lifecycle status transitions (CREATED → QUEUED → SENT → FILLED). Timestamp at each state change.

FX rates are collected daily alongside equity price data. As of the reference run: SGD/USD 0.7838 (25 Apr 2026), 60 days of rate history stored. Position-level currency conversion enables accurate per-instrument P&L; attribution across currency boundaries.

PLATFORM INTERFACE

InvestPuppy Admin Portal

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Dashboard
Overview & Analytics

CLIENT MANAGEMENT

Customers
Client Profiles & KYC

Onboarding
New Client Setup

PORTFOLIO MANAGEMENT

Portfolios
Portfolio Overview

Strategies
Investment Strategies

Allocations
Asset Allocation

Rebalancing
Portfolio Rebalancing

TRADING & ORDERS

Orders
Trade Orders

Executions
Trade Executions

Settlements
Trade Settlements

MARKET DATA

Instruments
Securities Master

Exchange Rates
FX Rates (USD/USD)

SGD / USD
21dc0dc6-108e-4716-88f9-06942382e284

Latest Close
0.783800

Latest Date
4/25/2026

Records
60 days

Pair
SGD/USD

Rate History (Latest 60 Days)

Date	Open	High	Low	Close	Change
4/25/2026	0.783800	0.783800	0.783800	0.783800	+0.153%
4/24/2026	0.782600	0.783900	0.781800	0.782600	-0.166%
4/23/2026	0.783800	0.784600	0.782800	0.783900	-0.191%
4/22/2026	0.785500	0.786400	0.784200	0.785400	-0.254%
4/21/2026	0.787300	0.787700	0.785300	0.787400	+0.280%
4/20/2026	0.785200	0.787800	0.785200	0.785200	-0.038%
4/17/2026	0.785700	0.789400	0.785400	0.785500	-0.191%
4/16/2026	0.787100	0.788300	0.785500	0.787000	+0.013%
4/15/2026	0.786900	0.787200	0.785600	0.786900	+0.051%
4/14/2026	0.785200	0.787600	0.784800	0.786500	+0.485%
4/13/2026	0.782600	0.785200	0.782500	0.782700	-0.344%
4/10/2026	0.785400	0.786200	0.783900	0.785400	+0.102%
4/9/2026	0.784600	0.786400	0.783800	0.784600	+0.102%

Step 11 · Exchange Rates — SGD/USD. Latest close: 0.783800. Latest date: 4/25/2026. 60 days of rate history. Daily open, high, low, close with percentage change. Rates collected automatically at 8 AM SGT alongside equity price data.

END-TO-END WORKFLOW SUMMARY

Step	Name	Role	Output
01	Screen the Universe	Analyst	Filtered SGX universe: financial services, real estate, industrials. Liquidity and dividend-continuity screens applied.
02	Optimise the Portfolio	Analyst	Deterministic max-Sharpe solve, not sampled. Max-Sharpe portfolio identified. Expected return 45.0%, volatility 13.9%, Sharpe 3.09 (backtest).
03	Validate Diversification	Analyst	Correlation matrix confirmed. 5 active instruments (non-zero weight). Tracking error within 8% of STI.
04	Per-Stock Signal Selection	Automated + Analyst	U10: EMA · S63: EMA · D05: MACD · O39: EMA · BS6: BB. XGBoost model trained and deployed.
05	Strategy Review	PM	Strategy approved by PM. All instruments, weights, indicators, and Sharpe ratios reviewed. Approval logged.
06	Client Onboarding	PM	Chen Family Office (SGD 500K, Aggressive) and Meridian Capital (SGD 300K, Moderate) created and linked to strategy.
07	Asset Allocation	PM	SGD 469,948 deployed across 5 instruments at live prices. 100-share lot rounding. 98.94% efficiency. Executable once Step 09 complete.
08	Order Generation	PM + System	5 signals: 1 approved (BS6 HOLD), 3 ML-blocked (U10, S63, O39), 1 low-confidence (D05). Approved orders queued via SQS.
09	Cash Funding	Operations	SGD 500,000 deposit recorded. Cash account funded. Audit trail entry created. Allocation executable.
10	Market Data Refresh	System	10 instruments · 3yr OHLCV history per instrument · SGD/USD and all configured FX pairs refreshed daily at 8 AM SGT.
11	Audit & FX Rates	System + Ops	Every action logged with user identity, timestamp, correlation ID. Strategy modifications require re-approval. FX at position level for multi-currency P&L;

Show us a mandate.

Pick any listed equity market, any currency, any benchmark. We will run the full Vektor workflow on your data and show you the output: the efficient frontier, the correlation matrix, the max-Sharpe allocation, and the per-instrument signal selection. No slides. No promises. Just the platform, working on your mandate.

Proof Partners: investpuppy.com/proof-partners · contact@investpuppy.com

The SGX mandate is the reference implementation. The platform supports any listed equity market. Other markets — LSE, US equities, Tokyo, Hong Kong, Dubai — are configurations, not separate products.

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The Full Document Suite

Organised by access tier — not a catalogue, a map.

Full reading-order guidance in the Due Diligence Navigation Guide.

UNGATED — 29 DOCUMENTS

VEKTOR COMMERCIAL

- Vektor At a Glance
- Vektor Brand Story
- Vektor Platform Brochure
- Due Diligence Navigation Guide
- What Vektor Is Not
- Why Not the Incumbents?
- Why Vektor

● Reference Output — SGX Equity Mandate (you are here)

VEKTOR RESEARCH PAPERS

- WP-09: Risk and Limitation Disclosure
- WP-10: Evaluating Performance

OUR BETTER WAY

- BW-01: Technical Debt
- BW-02: Vektor House Implementation
- BW-03: The Configurability Gap
- BW-04: AI as Instrument

UNVARNISHED

- UNV-01: Why Implementations Fail
- UNV-02: Nobody Owns It
- UNV-03: Complexity as Cover
- UNV-04: Plan Last
- UNV-05: The Change Request Trap
- UNV-06: Invisible Stakeholders
- UNV-07: The Hammer, the Tool, and the Methodology
- UNV-08: Life After Live
- UNV-09: The U in UAT
- UNV-10: Nine Women
- UNV-11: The AI Revolution — Automating Bad Practice at Scale
- UNV-12: Model Bank — the perfect solution for banks that don't exist
- UNV-13: The parameter that broke the camel's back

WHITE PAPERS

- WP-12: Rebalancing: Drift Thresholds and Disclosure
- WP-13: Portfolio Valuation Methodology

investpuppy.com/documents

REGISTRATION REQUIRED — 13 DOCUMENTS

VEKTOR COMMERCIAL

- Vektor FAQ
- One Platform, Three Delivery Models
- Reference Output — SGX · NASDAQ · LSE · 21 May 2026

VEKTOR RESEARCH PAPERS

- WP-Index · Research Series Index
- WP-01: Quantitative Portfolio Construction
- WP-02: Signal Optimisation
- WP-03: Capital Allocation
- WP-04: Indicator Selection
- WP-05: Multi-Currency
- WP-06: Audit and Compliance
- WP-07: Technical Architecture
- WP-08: AI and ML Philosophy

WHITE PAPERS

- WP-11: Signal Robustness Architecture — Why walk-forward validation was considered and discarded

How to register: investpuppy.com/research

NDA REQUIRED — 8 DOCUMENTS

VEKTOR COMMERCIAL

- First 90 Days
- Mutual Non-Disclosure Agreement
- Proof Partners Programme
- Workflow Integration Guide
- Vektor Operational Walkthrough — Client to Portfolio Valuation
- Proof Partners Agreement

INVESTPUPPY

- Alloy Partners Programme

OTHER

- Vektor OpenWealth Integration — Commercial Overview

Available once a Proof Partners conversation begins. Start at investpuppy.com/proof-partners

