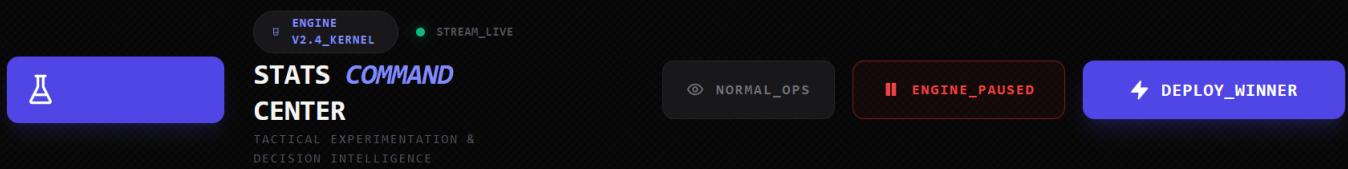


EXPERIMENT\_KERNEL\_STABLE

MSRPT\_VALIDATED

# DECISION INTEL



## TACTICAL OPERATIONAL PROTOCOL GUIDELINES FOR STATISTICAL DECISION MAKING

### STATISTICAL CONTEXT

This platform is not just a dashboard; it is an observability layer for causality. We use mSPRT (Mixture Sequential Probability Ratio Test) to provide p-values that are always valid, regardless of how often you look at the data.

### DECISION LOGIC

- Check for 'SRM' balance (Randomization Health).
- Monitor 'Sequential Monitoring' for boundary breaks.
- Look for 'CUPED' efficiency gains.
- Execute 'DEPLOY' once the mission is clear.

### IMPLEMENTATION

Engine utilizes O'Brien-Fleming boundary spending. Covariate adjustment is performed using a shrinkage estimator for theta to minimize pre-period noise bleed-through.

## VITAL SIGNAL DIAGNOSTICS

### TYPE I ERROR (A)

**0.05**

LOCKED

### STATISTICAL POWER

**82.4%**

OPTIMIZED

### CURRENT MDE

**2.14%**

NOMINAL

### SRM TEST

**p=0.45**

HEALTHY

## > SEQUENTIAL MONITORING

MONITORING\_LIVE

LAN-DEMETS\_PROTOCOL\_V2

## OPERATIONAL\_NODES

LIVE\_HYPERLINK

US\_EAST\_01

EU\_WEST\_03

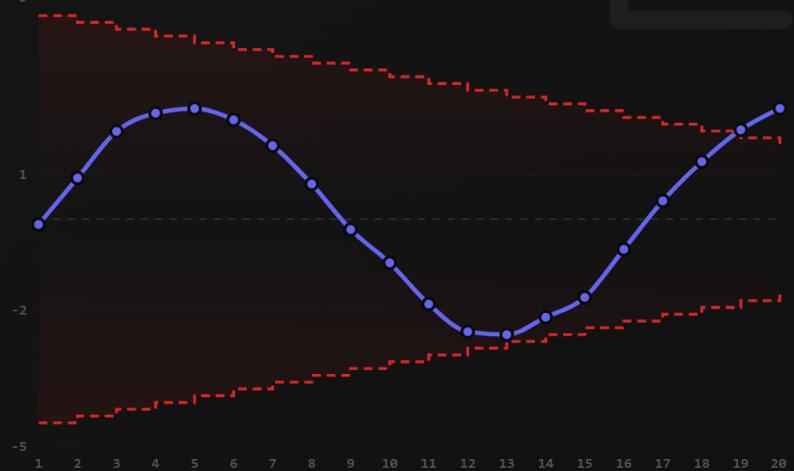
SYNCD

4ms

SYNCD

32ms

Z-SCORE\_MAGNITUDE



### INTERIM\_ANALYSIS:

LOOK 14 OF 20



CURRENT\_Z\_SCORE: -2.17  
| WIN\_THRESHOLD: >  
+2.55

CHECK\_FUTILITY\_MODE



### SEQUENTIAL INTELLIGENCE MANUAL

UNDERSTANDING THE PATH TO SIGNIFICANCE

#### STATISTICAL CONTEXT

The center blue line is our Treatment effect. The red boundaries are the 'Decision Fences'. If the blue line hits the TOP, we ship. If it hits the BOTTOM, we kill. Anything in-between is 'Neutral Ground'-continue the mission.

#### DECISION LOGIC

Surveil daily. We use Alpha Spending to prevent 'P-Hacking' (data-peaking bias). This chart provides a mandate to act the moment significance is mathematical reality.

#### IMPLEMENTATION

Computes boundaries via Lan-DeMets alpha spending (O'Brien-Fleming) with 20 preset interim analysis points.



### LOGIC\_INFERENCE\_LOG

REAL\_TIME\_FEED

[04:12:01]

SPRT\_KERNEL\_CYCLE

Boundary re-computation for interim look 14.

IMPACT: STABILIZING ALWAYS-VALID INTERVALS.

[04:12:45]

SRM\_CHECK\_SUCCEEDED

Sample ratio balance within 0.1% of target allocation.

[04:13:30]

CUPED\_PRE\_PERIOD\_LINK

Retrieved 30-day pre-experiment behavioral signatures.

ASIA\_PAC\_09

LATENCY

150ms

US\_WEST\_02

SYNC'D

12ms

### ⚡ NOISE\_ELIMINATION

35.4 %

CUPED\_SIG\_BOOST\_INTEL

SAMPLE\_ALPHA\_GAIN  
EFFICIENCY BOOST

+1.5x

HORIZON\_CONTRACTION  
TIME RECOVERY

-4.2D

### CUPED TACTICAL ADVANTAGE

REDUCING NOISE TO INCREASE SPEED.

STATISTICAL CONTEXT

DECISION LOGIC

IMPLEMENTATION

Covariance adjustment using pre-experiment covariates Theta minimizes var(Y - theta\*X).

Applied at the micro-segment level.

CUPED links the pre-experiment period (last 30 days) to the active period. This creates a baseline for every single user, allowing us to scrub out 'natural' variance that would otherwise muddy the result.

Always keep active. It acts as a safety layer -if a user was already a high-converter before the experiment CUPED ensures we don't accidentally credit the Treatment for their conversion.

It acts as a safety layer -if a user was already a high-converter before the experiment CUPED ensures we don't accidentally credit the Treatment for their conversion.

## KERNEL OPERATIONS DATA

UNDERSTANDING THE SYSTEM LOGIC

### STATISTICAL CONTEXT

The Inference Log shows exactly what the Engine is doing at any micro-second. It monitors for data quality, recalculates boundaries, and links pre-experiment behavioral covariates for noise scrubbing.

### DECISION LOGIC

Use this as a 'Live Diagnostic'. If the log stops or starts showing 'RETRY', there may be an issue with the underlying data pipeline.

### IMPLEMENTATION

Logged via asynchronous sidecar process to minimize overhead on the primary statistical kernel.

## INTEGRITY\_FIREWALL\_PROTOCOL

TYPE\_I\_STABILITY  
CALCULATED FALSE POSITIVE RISK

4.8%

DATA\_QUALITY\_SCORE  
SIGNAL CLARITY INDEX

99.2%

COVARIATE\_EQUILIBRIUM  
RANDOMIZATION ENTROPY

p=0.67

## INTEGRITY\_FIREWALL\_SPECS

MAINTAINING THE STATISTICAL PERIMETER

### STATISTICAL CONTEXT

The Firewall protects the experiment from 'Garbage In, Garbage Out'. It runs CRC checks on every incoming event packet and monitors the p-value of the covariate balance to ensure randomization hasn't been corrupted by external factors.

### DECISION LOGIC

If 'COVARIATE drops, investigate the randomization hash. It usually means an upstream filter is biasing which users enter which group.

### IMPLEMENTATION

Stability monitored via IUM Brownian motion simulation Covariate p-value uses a Two-Sample Kolmogorov Smirnov test.



LIVE\_EVENT\_COMMAND

INGEST\_THROUGHPUT 14.2K ACTION/SEC

RETRY\_INDEX  
0.02%

BUF\_LOAD  
12%

## OPERATIONAL\_DECISION\_PARAMETERS



TEST\_KIND  
**MSPRT\_SEQUENTIAL**



NORTH\_STAR  
**REVENUE\_PER\_USER**



MIN\_DURATION  
**14\_DAYS\_LOCKED**



SOURCE\_PIPE  
**HDFS\_GOLD\_BATCH**

● COMMS\_STABLE

SDK\_V3.2.1-SECURE

◊ COMPLIANCE\_ENFORCED

⬇ GENERATE\_DOSSIER

TECH\_COMMAND\_INTEL  
 // BUILD\_829.4