VCF Engine Architecture – Updated with Sector_Engine
Final Phase Structure (Simplified & Clean)
```
Regime_Engine # Phase I — Economic Regime Engine
Sector_Engine # Phase II — Sector Interaction & Structure
Unified_Engine # Phase III — Full-System Geometry
Wavelit_Engine # Phase IV — Wavelet + Resonance Regime Engine
```
This naming is intentionally simple, scalable, and easy for Claude and all AI collaborators to implement and maintain.

Phase I — Regime_Engine
Purpose:
Economic geometry, leading/lagging indicator analysis, macro cycle classification.
Core Math:
- Z-score normalization
- Macro pillar M(t)
- Liquidity pillar L(t)
- θ = atan2(M, L)
- Cθ = sqrt($M^2 + L^2$)
- Macro regime mapping

Phase II — Sector_Engine
Purpose:
Analyze sector interactions, leadership/lagging structure, sector cycles, and internal sector regimes.
This is a **novel concept** — turning sector dynamics into their own regime system.
Core Math:
- Sector normalization
- Sector pillar E(t)
- Risk pillar R(t)
- ϕ = atan2(E, R)
- Cϕ = sqrt($E^2 + R^2$)
- Sector dispersion
- Sector breadth
- Harmonic features (cycle power, dominant period)

Phase III — Unified_Engine
Purpose:
Combine macro + sector + harmonic features into a unified VCF state space.
Core Math:
- Unified feature vector X(t)
- PCA $\rightarrow$ Y1, Y2, Y3
- Θ_VCF, Φ_VCF, R_VCF
- Unified geometry
- Preliminary unified regimes

Phase IV — Wavelit_Engine
Purpose:
CWT-based wavelet system, multi-scale cycle detection, macro–sector resonance, final VCF regimes.
Core Math:
- Continuous Wavelet Transform
- Wavelet power spectrum
- Short/long power ratios

- Dominant frequency
- Resonance = cos(Δϕ at macro's dominant frequency)
- Integration into full VCF state space

Repo Organization Planning

You will upload your full GitHub repo, and I will:

✔ Scan & report the structure
✔ Identify duplication, clutter, and drift
✔ Map where engines live (currently `VCF-RESEARCH/vcf/`)
✔ Recommend a clean, final structure
✔ Ensure no important code or math is disrupted

This will be done file by file, folder by folder.

We will turn the repo from "chaotic exploration" → **research-grade architecture**.

Next Step

When you upload everything to GitHub, just say:

"Analyze my repo and produce the structure report."

I'll handle the full mapping.