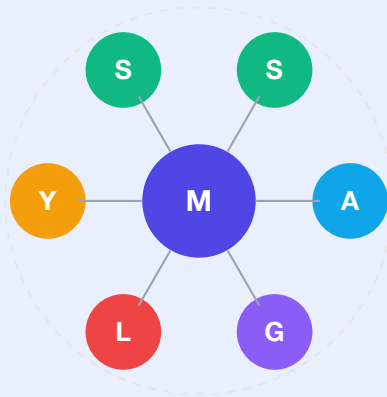


Math-Team

Signal-Based Multi-Agent System

Architecture Documentation



Version: 2.0

Framework: MicroAI

Agents: 11 specialized agents

Architecture: Signal-based orchestration

January 2, 2026

Contents

1	System Overview	2
1.1	Key Features	2
1.2	Workflow Summary	2
2	Complete Workflow	3
3	Agent Registry	4
3.1	Model Distribution	4
4	Signal Types	5
5	Difficulty Presets	6
6	Verified Geometry System	7
6.1	Verification Principle	7
7	Error Handling	8

1. System Overview

Math-Team là hệ thống multi-agent chuyên giải toán, được thiết kế theo kiến trúc **signal-based orchestration**. Các agent giao tiếp qua signals thay vì gọi trực tiếp, đảm bảo tính decoupled và khả năng mở rộng.

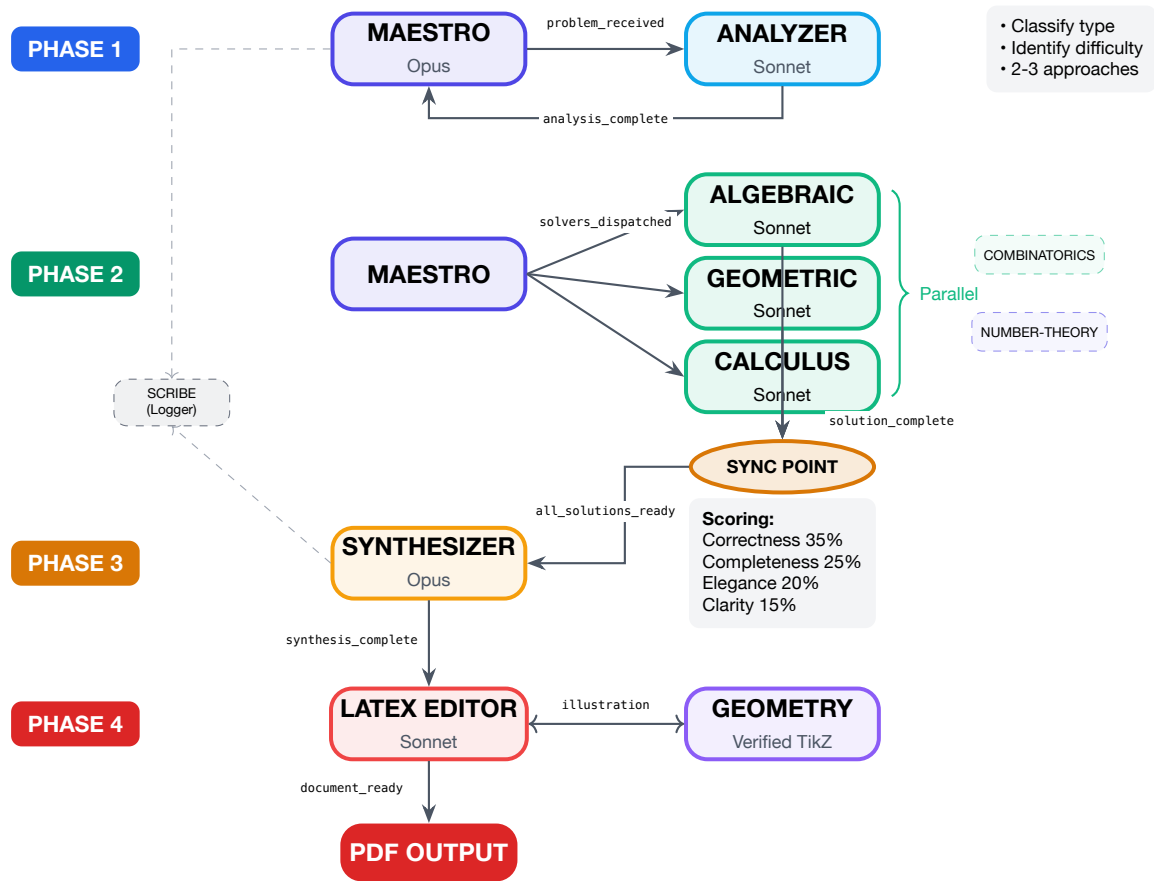
1.1 Key Features



1.2 Workflow Summary

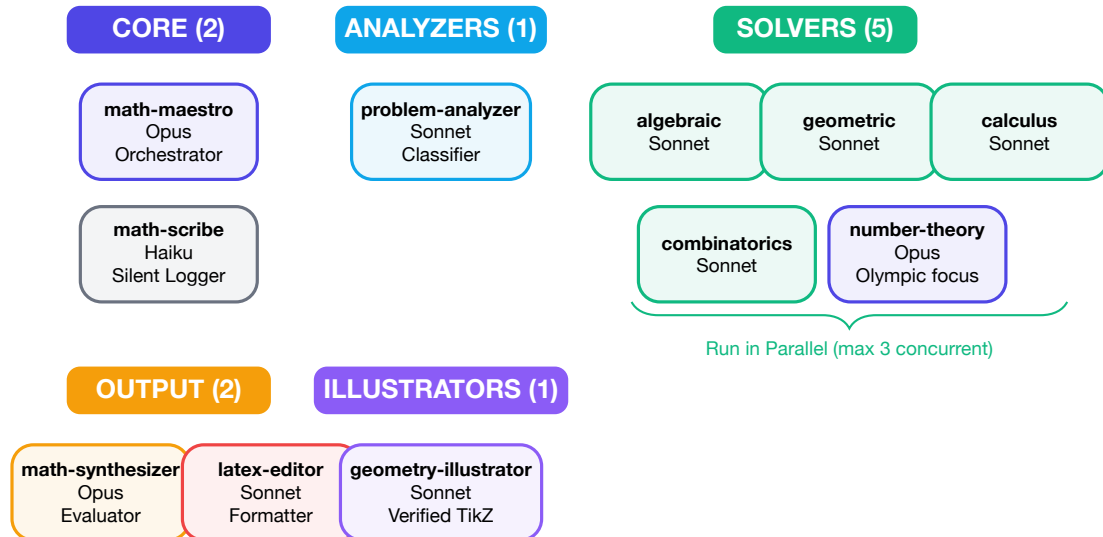


2. Complete Workflow



3. Agent Registry

Math-Team gồm **11 agents** được tổ chức theo 5 categories:

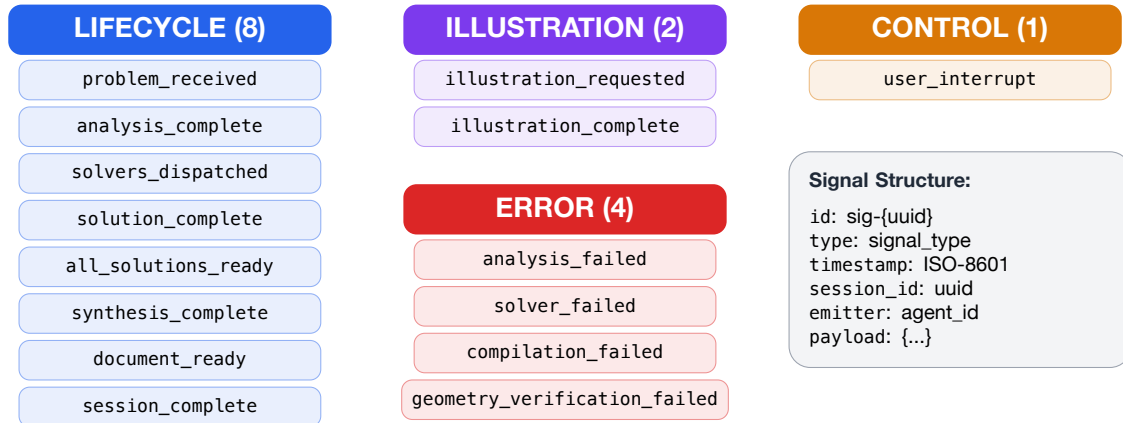


3.1 Model Distribution

Model	Count	Agents
Opus	3	math-maestro, math-synthesizer, number-theory-solver
Sonnet	7	problem-analyzer, 4 solvers, latex-editor, geometry-illustrator
Haiku	1	math-scribe (silent logger)

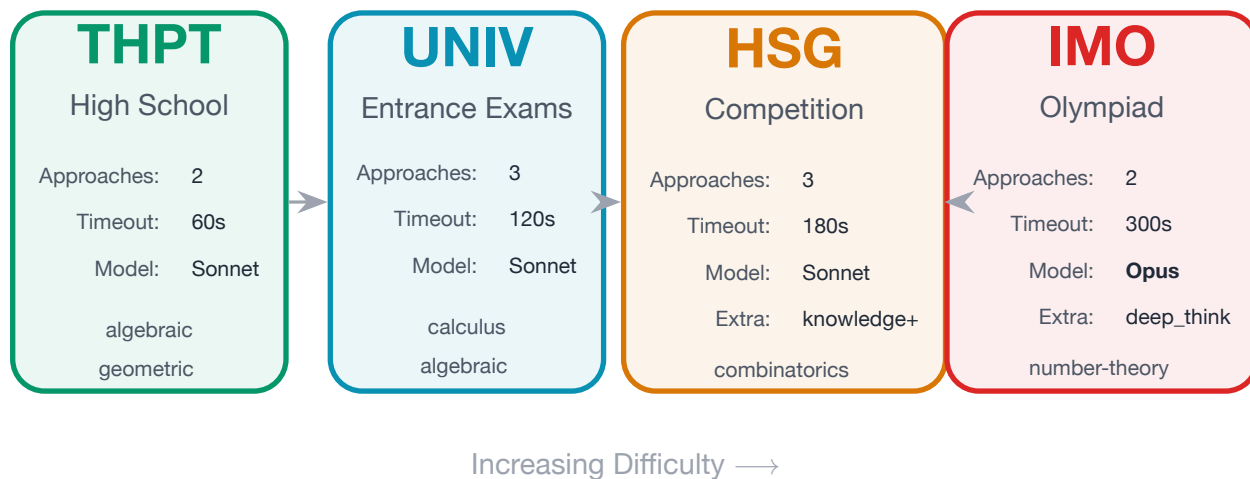
4. Signal Types

Agents giao tiếp qua **15+ signal types**, được chia thành 4 categories:



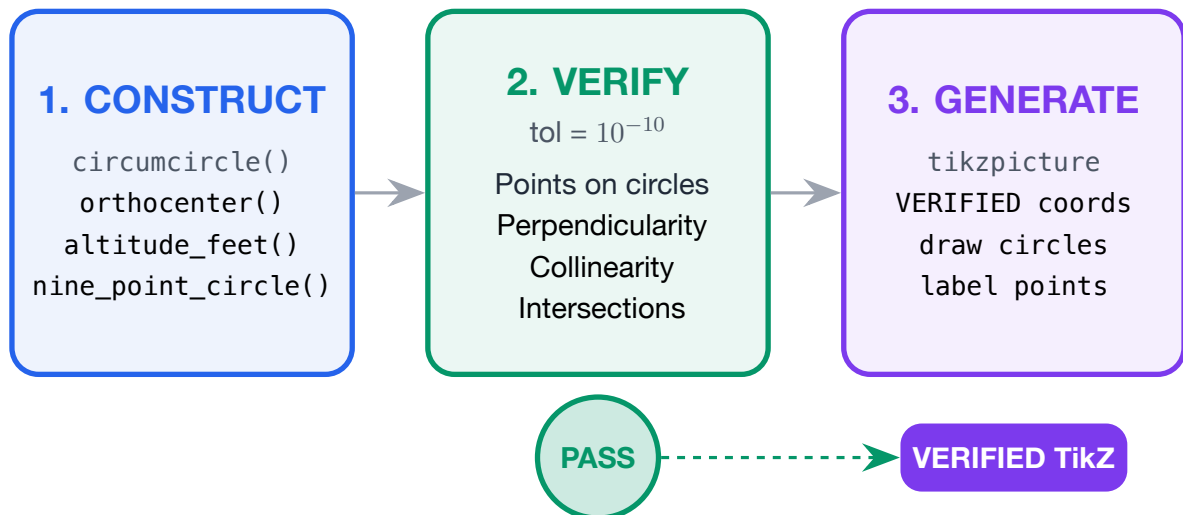
5. Difficulty Presets

Math-Team hỗ trợ 4 mức độ khó, từ bài tập THPT đến Olympic quốc tế:



6. Verified Geometry System

Geometry Illustrator sử dụng hệ thống verification đảm bảo mọi hình vẽ đều chính xác toán học:



6.1 Verification Principle

CONSTRAINT SATISFACTION > COORDINATE ASSIGNMENT

Mỗi điểm phải thỏa mãn **tất cả** ràng buộc hình học, không chỉ được gán tọa độ ngẫu nhiên.

Example: Orthocenter H must lie on ALL three altitudes simultaneously.

7. Error Handling

Math-Team áp dụng nguyên tắc **Graceful Degradation** - hệ thống tiếp tục hoạt động ngay cả khi một số thành phần gặp lỗi:

Error Type	Recovery Action
Analysis timeout (60s)	Notify user, offer manual problem classification
Single solver timeout	Continue with other solvers (minimum 1 solution required)
All solvers fail	Escalate to user, suggest alternative approaches
Conflicting answers	Synthesizer verifies mathematically, selects correct one
LaTeX compile failure	Retry with LuaLaTeX fallback engine
Geometry verification fail	Skip figure, continue with text-only solution

Key Resilience Principles

1. Partial completion acceptable (minimum 1 solution)
2. All error signals logged by math-scribe for debugging
3. User can interrupt and modify at any checkpoint

Summary

11 Agents

5 categories, specialized roles

15+ Signals

Decoupled communication

Parallel Solving

Max 3 concurrent solvers

Verified Geometry

Tolerance = 10^{-10}

4 Difficulty Levels

THPT → Olympiad

3 Output Styles

Detailed, Concise, Olympiad

USER → **MAESTRO** → **ANALYZER** → **SOLVERS** → **SYNTH** → **LATEX** → **PDF**