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The Twenty-Five Brain Architecture.

A technical deep-dive into the Mickai SIOS substrate, the six subsystems, and why this is structurally not a Mixture of Experts.

AUTHOR

Micky Irons

Founder and named inventor, Mickai LTD.
Crunchbase · LinkedIn · GitHub · mickai.co.uk

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Mickai LTD · Companies House 17166618 · press@mickai.co.uk · mickai.co.uk
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FOREWORD

A note from the author

Mickai is a Sovereign Intelligence Operating System with six subsystems and twenty-five brains. Multi-Brain Orchestration, Agent Tooling, Knowledge and Memory, Artifacts, Vinis Voice, and the Governance Layer. The Arbiter Brain sits at the head; the Audit Ledger Brain sits at the foot.

This ebook is the technical walk-through of how a cooperative-intelligence system routes deterministically while satisfying a regulator's chain-of-custody at the primitive layer.

The Mickai substrate primitives are filed at the UK IPO across the GB2607309.8 to GB2611702.8 and GB2611885.1 onwards families. The trade mark Mickai is registered at UK00004373277.

Micky Irons

Founder and named inventor, Mickai LTD · 15 May 2026

PART I · THE ARCHITECTURE

Six subsystems, twenty-five brains, deterministic routing

1. Six subsystems, twenty-five brains

The Mickai SIOS is organised into six subsystems. Multi-Brain Orchestration hosts the routing and reasoning brains. Agent Tooling hosts the brains that act on the operator's behalf. Knowledge and Memory hosts the retrieval and continuity brains. Artifacts hosts the creation brains. Vinis Voice hosts the personality and voice surfaces. The Governance Layer hosts the policy, audit, and control brains.

Twenty-five brains total. Each brain is a single-purpose model, dispatched from the Arbiter Brain on the basis of an explicit, deterministic routing function. The canonical taxonomy is at mickai.co.uk/brains.

2. The Arbiter Brain, in plain terms

The Arbiter Brain is the orchestrator at the head of the dispatch graph. It accepts an operator request, classifies the request against the taxonomy, and routes to one or more specialist brains. The routing function is explicit (no softmax gating, no probabilistic selection); the Arbiter emits a routing record that is itself signed and added to the audit chain.

Two operators running the same request through the same Arbiter version produce the same routing decision. The architecture is deterministic at the dispatch layer.

3. The Router Brain, in plain terms

The Router Brain sits one layer below the Arbiter and handles intra-subsystem routing. When the Arbiter dispatches a request to Knowledge and Memory, the Router decides which of the Knowledge brains (Hippocampus, Cortex, Cerebellum, Archive) is the right destination. Routing here is also explicit.

PART II · THE SUBSYSTEMS

Each subsystem, in turn

4. Multi-Brain Orchestration

The orchestration subsystem hosts the Arbiter Brain, the Router Brain, the Planner Brain, the Reasoner Brain, and the Reflector Brain. Together they handle dispatch, plan construction, chain-of-thought reasoning, and self-reflection on output quality. The subsystem is the head of the SIOS.

5. Agent Tooling

Agent Tooling hosts the brains that act on the operator's behalf in the world. The Browser Brain reaches the Internet through the hybrid sandbox. The Code Brain authors and reviews code. The Email Brain drafts and reviews outbound messages. The Calendar Brain schedules and inspects time. The File Brain reads and writes the operator's filesystem under explicit permissions.

6. Knowledge and Memory

Knowledge and Memory hosts the long-term continuity surface. The Hippocampus Brain handles episodic memory. The Cortex Brain handles semantic memory. The Cerebellum Brain handles procedural memory. The Archive Brain handles cold storage and recall. Together they give the SIOS a coherent continuity across sessions.

7. Artifacts

Artifacts hosts the creation brains. The Document Brain authors long-form documents. The Diagram Brain authors diagrams and visuals. The Slide Brain authors presentations. The Image Brain handles image generation, editing, and analysis.

8. Vinis Voice

Vinis Voice is the personality and voice surface of the SIOS. The Vinis Brain holds the SIOS's voice and personality, applied across every output the operator surfaces externally. Brand voice, register, and tone are produced through Vinis.

9. Governance Layer

The Governance Layer is the foot of the SIOS. The Policy Brain holds the operator's policy graph. The Permissions Brain enforces capability access. The Revocation Brain handles capability revocation. The Quorum Brain handles multi-party authorisation. The Audit Ledger Brain handles the OAR chain. Together they make the SIOS governable and auditable by construction.

PART III · WHY THIS IS NOT A MIXTURE OF EXPERTS

The structural difference from MoE architectures

10. Deterministic routing vs softmax gating

A Mixture of Experts (MoE) architecture routes inputs to experts using a learned, probabilistic gating function (typically a softmax over expert scores). The routing is non-deterministic; the same input may go to different experts across runs depending on numerical noise. The Mickai SIOS, by contrast, routes through an explicit deterministic function. The Arbiter's classification is a categorical decision recorded in the audit chain; two operators running the same input through the same Arbiter version always route to the same brain.

> **MoE is a model architecture. SIOS is an operating system architecture. The structural difference is at the dispatch primitive.**

11. Process isolation

Each brain in the SIOS runs in its own process boundary. State does not leak across brains except through the explicit message-passing interface that the Arbiter mediates. A compromised brain cannot quietly corrupt the state of an adjacent brain; the isolation is a structural property, not a runtime property.

MoE experts share a parameter space and a forward pass. The isolation property does not hold; the architecture cannot satisfy the regulatory expectation around fault containment.

12. Signed-action auditability per brain

Every action a brain emits is signed under the operator's TPM-bound ML-DSA-65 key and appended to the OAR chain. The audit trail is per-brain, per-action, hash-linked, post-quantum-signed, and replayable offline. The regulator walks the chain through the verifier and arrives at a deterministic verdict per brain action.

MoE architectures emit a single output; the routing decision (which expert handled which token) is internal to the model and is not, by default, surfaced as an audit record. The MoE audit surface does not satisfy regulator expectations on chain-of-custody.

PART IV · OPERATIONS

Running the SIOS in production

13. Brain bring-up and decommission

Bringing a new brain online is a governance event. The operator issues a brain manifest (the brain's name, version, capability set, model hash, policy bindings), signs the manifest, and the Governance Layer records the bring-up in the OAR chain. Decommissioning is the inverse; the operator issues a decommission record, the Permissions Brain revokes capability access, the Revocation Brain marks the brain's signing context as REVOKED in future verifier output.

14. Cross-brain conformance vectors

The Mickai SIOS ships conformance vectors per-brain. Each vector is a (input, expected output, expected audit record) triple; running the vector against a deployed brain produces a deterministic pass or fail. The vectors are the regression surface for SIOS upgrades, and they double as the third-party verification surface for any operator that wants to independently confirm a brain's behaviour against the published specification.

15. Closing

The twenty-five brain architecture is the technical answer to the question 'how do you build a cooperative-intelligence system that satisfies a regulator?' Deterministic routing, process isolation, per-brain audit chains, conformance vectors, and the OAR substrate at the foot of the SIOS. Engineering leadership at any UK AI buyer is open to a thirty-minute architectural briefing at any time. press@mickai.co.uk.

APPENDIX · ABOUT THE AUTHOR

Micky Irons

Founder of Mickai LTD (Companies House 17166618, England and Wales, registered office 20 Wenlock Road, London, N1 7GU). Named inventor on the Mickai SIOS patent corpus, recorded on the UK Intellectual Property Office public register at numbers GB2607309.8 to GB2611702.8 and GB2611885.1 onwards. Trade mark Mickai registered at UK00004373277 (classes 9 and 42, filed 15 April 2026).

Before founding Mickai, Micky was a Sellafield site worker. The egress constraint observed from inside the regulated workstation is the engineering origin of the substrate described across the Mickai ebook series.

Profiles and links

mickai.co.uk · the canonical Mickai site.

crunchbase.com/person/micky-irons · founder profile.

linkedin.com/in/mickyirons · personal LinkedIn.

github.com/Micky-CMO · open-source position.

linkedin.com/company/mickai · Mickai LTD company page.

crunchbase.com/organization/mickyirons · Mickai LTD Crunchbase entry.

Email: press@mickai.co.uk

Colophon

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References and further reading

· Mickai brain taxonomy: mickai.co.uk/brains.

· Mickai OAR Brain documentation: mickai.co.uk/oar.

· NIST FIPS 204, Module-Lattice-Based Digital Signature Standard, August 2024.

· NIST FIPS 202, SHA-3 Standard, August 2015.

· Mickai trade mark UK00004373277, classes 9 and 42, filed 15 April 2026.