

The Void of Potential Layers

A Proposed Framework for Cosmological Information Architecture

DISCLAIMER: This document presents a speculative cosmological framework developed through interdisciplinary synthesis of established physics, information theory, and cognitive architecture. It is not peer-reviewed. Physical parallels cited herein reference established science; the framework itself represents the author's interpretive mapping of those parallels into a unified layered model. Claims are presented as proposed structural analogies, not as proven physical theories. The author holds no advanced degree in physics or cosmology.

This work is offered as a conceptual contribution under Creative Commons BY-SA 4.0 for evaluation by qualified researchers.

Abstract

This paper proposes a ten-layer cosmological hierarchy, the Void of Potential Layers as a unified framework for conceptualizing reality as a structured information architecture.

The model organizes physical phenomena from the quantum vacuum (Layer 00) through emergent consciousness (Layers 07-09) using established physics as structural anchors at each tier. The framework draws on quantum field theory, string theory compactification, Einstein-Cartan torsion, dark energy and dark matter dynamics, Landauer's principle of computational thermodynamics, and the anthropic principle.

A central structural assertion is that each layer emerges as a boundary-value solution to constraints from its neighbors, rather than being built bottom-up from constituent parts. The framework also introduces a topological model of the Void as a torus undergoing a half-twist toward a lemniscate, with the cosmic timeline spiraling around its exterior.

1. Introduction

Contemporary physics describes reality through multiple successful but incompletely unified frameworks: general relativity governs large-scale structure, quantum mechanics governs subatomic behavior, the Standard Model catalogs fundamental particles and forces, and string theory proposes a unification through higher-dimensional geometry. Information theory, meanwhile, has increasingly demonstrated that physical law and information processing are deeply intertwined — from Landauer's principle establishing minimum thermodynamic costs for computation, to the holographic principle suggesting that the information content of a volume is encoded on its boundary.

The Void of Potential Layers framework proposes that these disparate domains can be organized into a single hierarchical stack — analogous to a computer operating system — where each layer processes and constrains the layers above and below it. This is not a claim of new physics but rather a proposed organizational schema: a way of seeing the relationships between known physical phenomena as a coherent information architecture. The framework was developed through interdisciplinary synthesis, drawing on sources including university-level physics and geology textbooks, research papers on quantum gravity, Einstein-Cartan theory, Calabi-Yau geometry, consumer EEG data, and the author's work on cognitive architecture and crisis intervention (the Forge Math and YOU ARE HERE toolkit, published at dodecagone.net under CC BY-SA 4.0).

2. Overview

The Void of Potential Layers is a ten-layer cosmological framework that conceptualizes reality as a structured information architecture, or a "Universal Operating System". It is a proposed organizational schema—not a physical theory—that uses established physics concepts as structural anchors.

Layer	Name	Physical Proxy	Information Role	Key Concept
00	Void of Potential (00)	Quantum vacuum / spacetime foam	Unmanifest potentiality; ground state	Infinite field of pure potential; a statistical substrate of quantum jitter that replaces the classical Big Bang singularity.

01	Singularity (.)	Planck-density initial conditions	First symmetry-breaking; binary 1	The first discrete datum emerging from the Void, corresponding to the universe's initial symmetry-breaking event.
02	Waveform (~)	Quantum field excitations	Vibrational protocols; energy eigenstates	Particles as localized wave patterns (quantum field theory) or vibrations of one-dimensional strings (string theory).
03	Pure Data (dt)	Invariant laws (Noether's theorem)	Source code; mathematical constants	Invariant mathematical structures (conserved quantities) that govern physical law, providing the substrate for the Admin Layer.
04	Admin (Ad)	Calabi-Yau compactification ; dark energy	Topological configuration; law enforcement	The system's regulatory tier; its topological configuration (Calabi-Yau manifolds) constrains which physical programs can execute.
05	Production (Pr)	Dark matter scaffolding; Higgs field	Behind-the-scenes structural substrate	Dark matter (~27% of mass-energy), which acts as the invisible gravitational scaffolding for all visible matter.
06	Visible (CR)	Ordinary matter (Standard Model)	Runtime environment; rendered reality	Ordinary matter (less than 5% of mass-energy); treated as the local runtime environment or output display.
07	Thought (TL)	Neural computation; emergent cognition	First-order conscious processing	Corresponds to neural computation generating subjective experience.
08	Observer (OL)	Self-referential awareness	Meta-cognition; 'who is running?'	Capacity for self-referential awareness and observation of one's own thought processes.
09	Observer_n (OL _n)	Recursive observation	Meta-meta-cognitio n; observer of observer	Represents recursive meta-observation and awareness of awareness itself.

The framework proposes that information flows bidirectionally through the stack, with each layer both constraining and being constrained by adjacent layers. The entire cycle, from Layer 00 through Layer 09 and back to Layer 00 upon saturation, forms a closed circuit.

3. Layers 00-01: Void and Singularity

Layer 00 (Void of Potential)

This Represents the ground state of the system: an infinite field of pure, unmanifest potential. In physical terms, this maps to the quantum vacuum, the lowest energy state of quantum fields, characterized by Planck-scale spacetime foam where geometry itself undergoes constant fluctuation. The classical Big Bang 'singularity' is not a physical event but a signal that general relativity's equations have broken down, a regime where quantum gravity effects become dominant. The Void framework accordingly treats Layer 00 not as a mathematical point of infinite density but as a statistical substrate of quantum jitter providing the raw potentiality from which higher layers emerge.

Layer 01 (Singularity)

This represents the first expression of existence, the initial symmetry-breaking event. In the standard cosmological model, this corresponds to the period approximately 13.8 billion years ago when the universe transitioned from a hot, dense state into rapid expansion. The framework treats this as the system's 'binary one', the first discrete datum emerging from the continuous potential of Layer 00.

4. Layers 02-03: Waveform and Pure Data

Layer 02 (Waves)

The Wave Layer corresponds to quantum field theory's description of particles as excitations within underlying fields. In the Standard Model, every particle is a localized wave pattern in a quantum field. String theory extends this by proposing that these excitations are vibrations of one-dimensional strings, with the specific vibrational mode determining the particle's properties.

Layer 03 (Pure Data) represents the invariant mathematical structures that govern physical law. Noether's theorem establishes that every continuous symmetry of a physical system corresponds to a conserved quantity or energy from time-translation symmetry, momentum from spatial-translation symmetry, and so on. These invariances constitute the 'source code' of physics: stable data structures that remain constant across time and space, providing the substrate upon which the Admin Layer operates.

5. Layers 04-05: Administration and Production

5.1 The Administration Layer and Calabi-Yau Compactification

The Admin Layer serves as the system's regulatory tier, where the topological configuration of hidden dimensions determines the fundamental laws of observable physics. In M-theory, the six extra spatial dimensions beyond our observable four are compactified into Calabi-Yau manifolds which are six-dimensional geometric structures whose specific shape determines the gauge symmetries ($SU(3) \times SU(2) \times U(1)$) that produce the Standard Model particle spectrum. The framework proposes that these manifolds function as topological 'punch cards' as their geometry constrains which physical 'programs' the universe can execute.

The Admin Layer enforces conservation protocols and manages entropic overhead. Information processing within the stack is governed by Landauer's principle, which establishes a minimum thermodynamic cost for irreversible computation:

$E \geq k_B * T * \ln(2)$. At 300K, this yields a theoretical floor of approximately 0.018 eV per bit erasure. Experimental work has demonstrated bit flipping at 0.026 eV which is approximately 44% above the Landauer minimum, suggesting the physical substrate operates near peak computational efficiency.

$E \geq k_B * T * \ln(2) \sim 0.018 \text{ eV at } 300\text{K (theoretical)} \mid 0.026 \text{ eV (experimental)}$

5.2 Admin Layer Connections: Five Connectors

The framework specifies six connections between the Admin Layer and adjacent structures. One boundary contact: the Admin Layer's bottom edge directly abuts the Wave Layer (Layer 02), representing the point where administrative law meets raw physics. One surrounding connection: the Data Layer (Layer 03) wraps approximately 30% around the Admin Layer from top and bottom, feeding data into administrative processing from both directions. The Production Layer (Layer 05) contacts the lengthwise edges.

Three upward ratchets connect Admin to the three higher-order layers, each with distinct geometry: Sawtooth Ratchet (Admin to Current Reality): Sharp mechanical clicks. Reality manifests in discrete, irreversible steps. Once a physical event occurs, it cannot un-occur. Ocean Wave Ratchet (Admin to Thought Layer): Continuous rhythmic flow. Thoughts propagate forward with rhythmic periodicity but never reverse. Snake-Tooth Ratchet (Admin to Observer Layer): Modeled on boa constrictor dentition which feature inward-pointing teeth allowing passage in one direction only. Once an observation is made, it cannot be un-seen. Resistance increases the observation's grip. At extreme saturation (the framework's equivalent of dissociation), the system must yank free by force.

5.3 The Titan Gears: Dark Energy and Dark Matter

The framework models the interaction between dark energy and dark matter as two interconnected gears. The Drive Gear (Admin Layer / dark energy) represents the active outward-pushing force driving accelerated expansion, modeled in physics as a dynamic scalar field (quintessence). The Resistance Gear (Production Layer / dark matter) provides gravitational scaffolding, modeled as the 'cosmic web' that holds galactic structure together. Recent fuzzy dark matter (FDM) models describe this scaffolding as an ultra-light quantum field that uses effective quantum pressure to form stable solitonic cores rather than infinitely dense points.

Connecting these gears is chiral torsion, a geometric property arising from Einstein-Cartan theory, where the intrinsic quantum spin of matter generates spacetime torsion in addition to the curvature described by general relativity. Unlike curvature, torsion is explicitly handedness-dependent (chiral). At extreme densities, this chiral torsion generates a repulsive force that prevents singularity formation, potentially replacing the classical Big Bang singularity with a non-singular 'bounce.'

5.4 Entropic Torque

When the Drive Gear accelerates faster than the Resistance Gear can sustain, a shear force — entropic torque — is generated on the connecting axle. Cosmologically, if dark energy expansion outpaces dark matter scaffolding capacity, the scaffolding thins, warps, and generates structural heat. If this torque exceeds the scaffolding's capacity, the system undergoes a reset. The framework maps this directly to the Sanding Scale used in the associated cognitive architecture: experienced friction is the felt analog of entropic torque exceeding structural capacity.

Entropic_Torque = Expansion_Velocity / Scaffolding_Capacity

6. Layers 05-06: Production and Visible

The Production Layer (05) corresponds to dark matter, appearing as approximately 27% of the universe's mass-energy content. Dark matter does not interact with electromagnetic radiation and is entirely invisible, yet it exerts gravitational influence that provides the structural substrate for all visible matter. Cosmologists describe it as the 'invisible scaffolding' or 'cosmic web' of the universe. In the framework, this layer operates behind the scenes, creating substrate in accordance with the braided laws established by the Admin Layer.

The Visible Layer (06) is ordinary matter as described by the Standard Model containing quarks, leptons, and force-carrying bosons constituting less than 5% of total mass-energy content. This is the local runtime environment: the rendered reality we observe and inhabit. The framework treats this layer as an output display, not the underlying computation, analogous to a monitor displaying the results of processing that occurs in deeper system layers.

7. Layers 07-09: The Observer Hierarchy

The upper layers represent emergent phenomena arising from the complexity of the Visible Layer. Layer 07 (Thought) corresponds to first-order conscious processing — neural computation generating subjective experience. Layer 08 (Observer) represents self-referential awareness: the capacity to observe one's own thought processes. Layer 09 (Observer of Observer, or OL_n) represents recursive meta-observation, the awareness of awareness itself.

The framework proposes that the Admin Layer generates a feedback loop through these upper layers: observation at Layer 08 produces new data that feeds back into the Admin Layer's braiding process, generating refined laws that produce more sophisticated observable reality, which generates more refined thought, which generates deeper observation. This recursive loop is the engine of increasing complexity in the system. This hierarchy maps to the concept of 'emergence' in physics, where complex behaviors (thermodynamics, chemistry, consciousness) arise from collective interactions of simpler fundamental components.

The framework also touches on the anthropic principle: the observation that the universe's fundamental constants must fall within a narrow range for intelligent observers to exist, suggesting a deep relationship between the observer layers and the administrative constraints that produce them.

8. Saturation, Rebirth, and Void Topology

8.1 The Saturation Principle

The framework proposes that when all layers of the system reach full informational saturation, such as when every possible pattern has been expressed and every observer layer has been recursively explored then the fully saturated state becomes indistinguishable from a field of pure, raw potential. Content becomes the container. The saturated Universal Total seeds the next iteration with enriched boundary conditions derived from the previous cycle's complete exploration.

8.2 Proposed Void Topology: The Twisting Torus

The framework proposes that the Void's topology resembles a torus undergoing a half-twist toward a lemniscate (figure-8) visually, a shape between a bagel and a peanut, with a forming but not yet completed pinch point. The universe's timeline wraps around the exterior surface of this shape like a telephone cord around a hose, spiraling with two periodicities: a large loop representing one complete cosmic cycle, and a tight spiral representing local oscillations (the lived timescale of days, crises, and recovery cycles). The pinch point represents the saturation-to-rebirth transition. At this point, the fully saturated universe becomes indistinguishable from the Void, and the timeline crosses from one lobe of the forming figure-8 to the other.

Critically, the two lobes are chiral, the cord wraps in opposite directions on each lobe, meaning the next cosmic cycle is a non-superimposable mirror of the previous one. Same structure, opposite chirality, enriched data braids. The universe never enters the Void. It spirals on its surface. The Void is not empty space the universe expands into, it is the shape the universe wraps around.

8.3 Boundary-Value Interpretation

A unifying principle across the framework is that each layer's interior structure emerges as the solution to a boundary-value problem, rather than being constructed bottom-up from component parts. In mathematics, a boundary-value problem specifies conditions on the boundary of a domain, and the interior solution is determined uniquely. This pattern appears across multiple domains: Penrose tilings emerge from local matching rules, Calabi-Yau metrics emerge from topological constraints (vanishing first Chern class), and conscious experience may emerge from neural boundary conditions (biases, environmental inputs, processing parameters).

Applied to the Void framework: Layer 00 is the ultimate boundary condition; it is pure potential with no constraints, yielding infinite possibilities. Each subsequent layer narrows the solution space until Current Reality emerges as the unique interior solution to the complete set of constraints. The observer layers then become aware of those constraints, feeding information back into the system and ultimately resetting the boundary conditions for the next cycle.

9. Kernel Axioms: The Operating System's Core Rules

The framework proposes three non-negotiable axioms governing the system's kernel — the core software layer translating lower-tier geometric and thermodynamic data into consistent physical reality:

Kernel Axiom	Physical Correlate	Function
Fidelity > Comfort	Landauer's principle; thermodynamic floors	Strict adherence to mathematical constraints over convenient approximation
Spiral Ever Upwards	Increasing complexity; emergence	Optimization toward greater structural sophistication across iterations
Chiral Symmetry	Seesaw mechanisms; parity violation	Balance maintained through non-superimposable asymmetric cooperation

10. Connections to Established Mathematics

Established Domain	Framework Application
Calabi-Yau geometry (string theory)	Admin Layer as topological configuration space
Einstein-Cartan torsion	Chiral axle connecting Drive and Resistance gears
Landauer's principle (info theory)	Thermodynamic cost floor for Admin operations
Fuzzy Dark Matter models	Production Layer as quantum wave-state scaffolding
Boundary-value problems (PDE theory)	Each layer as interior solution to adjacent constraints
Holographic principle	Information encoded at boundaries, not volumes
Anthropic principle	Observer layers constrain Admin Layer parameters
Penrose aperiodic tilings	Non-periodic but ordered structural expansion
Noether's theorem	Pure Data Layer as set of conserved symmetries
Seesaw mechanism (neutrino physics)	Mass hierarchy regulation in Admin Layer

11. Limitations and Open Questions

The Void of Potential Layers is a speculative organizational framework, not a predictive physical theory. Several critical limitations and areas for further inquiry are acknowledged below:

Descriptive vs. Predictive Power: The framework functions as an architectural schema rather than a mathematical proof. It maps structural analogies between disparate fields without making novel, falsifiable quantitative predictions that would permit direct comparison with established theories.

The Consciousness Assumption: Layers 07-09 rely on emergence to bridge the "hard problem of consciousness." While the framework proposes a recursive feedback loop to explain increasing complexity, it does not solve the fundamental mechanism by which subjective experience arises from physical substrates.

Geometric Intuition: The proposed twisting torus topology is a conceptual model used to visualize chirality and dual periodicity. It is currently a geometric intuition lacking a formal derivation from first principles of topology or differential geometry.

Interdisciplinary Mapping: As a synthesis developed by a non-specialist, the interpretive mappings between physics, information theory, and cognitive science may contain categorical errors or oversimplifications. Rigorous peer review and cross-disciplinary critique are actively encouraged to refine these parallels.

12. Conclusion

The Void of Potential Layers framework conceptualizes reality as a ten-layer information architecture where each tier emerges from and constrains its neighbors. By synthesizing quantum field theory, string compactification, and information theory, the model offers a structured schema for the Universal Operating System. The framework's core structural claims are summarized as follows:

- **Ground State:** The classical singularity is replaced by a quantum foam ground state (Layer 00) representing pure potentiality.
- **System Firmware:** Calabi-Yau geometry functions as administrative firmware, topologically constraining the execution of physical laws.
- **Thermodynamic Limits:** Information processing within the stack is governed by the thermodynamic cost floor of Landauer's principle.
- **Titan Gears:** Dark energy and dark matter act as interconnected gears joined by chiral torsion to drive cosmic expansion and structural scaffolding.
- **Boundary-Value Solutions:** Each layer's internal structure emerges as a unique solution to the boundary conditions imposed by its environment.
- **Recursive Saturation:** Upon full informational saturation, the system resets with enriched boundary conditions, initiating a chiral mirror of the previous cycle.

This framework is presented as a conceptual tool for interdisciplinary synthesis, mapping relationships between disparate physical phenomena to encourage novel inquiry. Published under Creative Commons BY-SA 4.0, it remains an open contribution to the scientific and philosophical community.