

Nothingness and Beginning

Working document, Virtualism Theory project. The bootstrap thread: the argument that earns the foundations' assumption of at least one existent. This document develops the move from absolute nothingness to unity — Virtualism's first emergence and the cleanest single instance of the paradox mechanism. The foundations document (`foundations.md`) develops the apparatus of nodes, relationships, virtual wholes and facts on the assumption that there is at least one of them; `paradox_and_emergence.md` develops the generic mechanism of paradox-driven emergence. The present document fills the gap between those two: it gives the argument for there being something rather than nothing, and it does so as the inaugural case of the paradox-and-emergence engine.

0. Why this document exists

`foundations.md` assumes there is at least one existent and develops the relational apparatus from there. `paradox_and_emergence.md` characterises the engine of becoming — paradox forcing the production of new dimensions — and registers its first historical instance as the move from nothingness to unity. Neither document argues for that first instance. This one does.

The argument matters for three reasons. First, it is the structural floor of the architecture chain: every subsequent emergence operates on something previously emerged, and if there is no first thing the chain has nothing to start from. Second, it is the cleanest possible demonstration of the paradox mechanism, because it runs in the limit

case where there is, by hypothesis, nothing else to do any of the work. Third, it is the project's answer to the question Heidegger called the fundamental question of metaphysics — *why is there something rather than nothing?* — and that answer is the most compact statement of what Virtualism is for.

The position is well-developed in the diaries and stable across more than five years of formulation, from the StackExchange "two axioms" post of April 2019 (Diary 036) through Diary 064B (May 2025). The formulations differ in compression and emphasis but agree in substance. Where they pull in different directions, the resolution will be flagged.

1. The question, and why it is not the right question

The traditional question is *why is there something rather than nothing?* It has been answered, over the centuries, in three main ways:

- **The theological answer.** There is something because God made it. This is the "free lunch" answer. It does not solve the problem; it relocates it. Where did God come from? If God needs no further cause, why does anything else? If God can be its own cause, why can't Existence?
- **The materialist answer.** There is something because the Big Bang happened. This is the second free lunch. Where did the Big Bang come from? A quantum fluctuation? A prior cosmos? An inflaton field? Each move buys an explanation of one stage at the cost of postponing the question. (Diary 063B, 22 February

2025; Diary 60C, 29 June 2025: *"any explanation has to be one that bootstraps existence."*)

- **The denial.** There is no such question to ask, because there has always been something. The infinite past is no problem: it just stretches back. This is the position taken by some cosmologists who prefer eternal models, and it is in family with the more general philosophical view that the question presupposes what it claims to be asking after.

None of these is satisfactory. The first two pay for an explanation of Existence with an existent that is itself unexplained. The third walks away from the question.

There is a fourth move, which is the move Virtualism makes. The question *why is there something rather than nothing?* is asking *from inside* something — from a position where the questioner already exists and is wondering why. From that position, nothingness is the strange option and somethingness is the default. But the question becomes tractable if we invert it. (Diary 046, 25 October 2021; Diary 049 on the *gedanken* technique; Diary 063C: *""Why Is There Anything At All?' may at first seem an intractable question, but if we alter it to 'What if there were nothing?' then we discover the story of Emergence."*)

The reframed question is:

> *What would nothing be like?*

Or, since "be like" already presumes more than the question is entitled to:

> *What would absolute nothingness be?*

This is the question Virtualism answers. The answer is the bootstrap.

2. Defining nothingness

To answer *what would absolute nothingness be?* we must first say what we mean by absolute nothingness. The diaries give a consistent and stringent definition (Diary 042, 15 October 2020 — the Systematic Statement; Diary 050, 29 October 2022 — Defining Nothingness; Diary 052, 12 June 2023 — the Kauffman/Quantum-Decoherence passage; Diary 063C — the No Free Lunch passage). The definition is *eliminative*: nothingness is the state in which *nothing whatever* obtains. Specifically:

- No universe, and no other universe.
- No God, no gods.
- No time. No space. Nothing that requires time or space.
- No laws, no rules. No mathematics. No basis for physics.
- No numbers — not even one.
- Nothing that could be considered a cause of something.

This is *absolute* nothingness, not the physicist's vacuum (which has fields, quantum fluctuations, and a metric) and not the philosopher's *void* (which has spatial extension). It is also not the theologian's *creatio ex nihilo* with God still standing offstage. The diary's formulation is at its most precise in Diary 052:

> *Nothingness more absolute than no thing. No place for there to
> be a thing, no law to dictate what kind of thing. No number to
> count or name a thing. No division to separate a thing.*

This stringency matters. The bootstrap argument works only against this absolute notion. If any pre-existing structure is permitted — laws, fields, geometry, even logic considered as a substantive existent — then the bootstrap is just a deduction from that pre-existing structure, and the regress reopens: what makes the laws hold? Virtualism cannot afford to leave a foothold for that regress, so it removes all footholds at the outset.

A common objection at this point: doesn't the very statement of absolute nothingness presuppose the law of non-contradiction? If "there is no X" is to mean anything, must not the laws of logic already obtain? The Virtualist reply is two-fold. First, the laws of logic are not pre-existing substantive *items*; they are aspects of what wholeness *is*, and so emerge with the first whole rather than preceding it. Second, the bootstrap argument does not require us to assert that logic-laws-as-items did not obtain; it requires only that no *thing* obtained. The status of logic is one of the things the argument has to deliver — not something it is allowed to assume. (More on this in §6.)

3. The paradox of nothingness

This is the move on which everything turns.

Absolute nothingness, as defined above, is the state in which there is no thing. *And yet*: absolute nothingness has a property. The

property is *wholeness*.

The argument is short and the diaries return to it repeatedly:

> *Yet, this state of nothing is paradoxical. Why, because it is
> necessarily complete, and so is a whole state. It has the
> property of wholeness, despite not existing.* (Diary 050, 29
> October 2022.)

> *"Nothing at all", by which I mean the state of complete
> nothingness, no matter, no space, no time, no laws, no one god,
> no numbers — not even one; that state is necessarily complete,
> necessarily whole — there is nothing and no more than that. That
> is paradoxical, that Nothing actually is factually wholeness.*
> (Diary 063C.)

> *Yet Nothingness so absolute is, in all its fact, complete; a
> singular fact; entire, alone, yet this thing must remain a
> paradoxical something and nothing. The whole, being a fact,
> exists as truly as any other fact ever did — it cannot be
> gainsaid.* (Diary 052, 12 June 2023.)

The argument is this. By hypothesis, in absolute nothingness there is nothing more and nothing less than nothing. That stipulation — that there is *no more than* nothing — is itself a *completeness* claim. To say "there is nothing, and nothing further" is to assert of nothingness that it is *all there is*. But to be all there is is to be entire. To be entire is to be whole.

Note how little this argument helps itself to. It does not assume that some logical principle is held over from a prior state and

imposes wholeness on nothingness. It does not assume that some external observer is present to register the wholeness. It does not assume that "wholeness" is a concept already available, waiting to be applied. The argument is internal to the stipulation: the *content* of "absolute nothingness" — the very definition that says "nothing whatever, and no more than that" — *is* the predicate of completeness. The wholeness is not an addition to nothingness; it is what saying "absolute nothingness" amounts to.

This generates the paradox. Absolute nothingness is the state in which nothing obtains; absolute nothingness has the property of wholeness; therefore something obtains (namely, wholeness). The two sides cannot both be true and cannot both be false.

In the vocabulary of `paradox_and_emergence.md` §3 — the four determination cases — this is an *overdetermined* situation: there are granted principles (the definition of nothingness, which says nothing obtains; and what wholeness is, which says something obtains) that resolve the matter incompatibly. Granted principles incompatibly resolve. That is paradox in its generic form. (For the technical formulation, see paradox_and_emergence §3 adopting Eldridge-Smith's 2025 generic definitions.)

Paradox, on Virtualism, is generative. Where granted principles incompatibly resolve, the resolution overflows into a new dimension (`paradox_and_emergence.md` §§4–5). The new dimension here is the dimension of being itself. Wholeness is the *something* that nothingness was required not to contain — and yet nothingness has it. The resolution: *nothingness is also something*, the something being the bare fact of wholeness, which is unity. Unity exists.

4. Unity is the first existent

Unity arrives as the resolution of the paradox of nothingness. It is not a thing added to nothingness from outside; it is what nothingness is *also*, once the paradox of its wholeness is acknowledged.

Several features of unity are worth registering:

Unity is structurally a relationship

Unity is the *relationship* between nothingness and its own wholeness. (Diary 036, 20 April 2019 — the Two Axioms: *"a virtual link between nothing and itself."* Diary 51, 10 January 2023: *"That whole thing is just the virtual relationship that necessarily exists between nothingness and its own wholeness."*) This is consequential. Unity is not a monolithic substance from which everything else will later have to be carved. From the moment of its arrival, unity has *internal structure*: it is the relating of two things — nothingness and the wholeness of nothingness — even though both of those things, taken alone, are null.

This already gives Virtualism its characteristic ontology. There is no substantial stuff at the bottom waiting to be related; the bottom is itself a relating. The foundations document's claim that *"everything reduces to virtual facts"* (§6) gets its grounding here: the first thing is a virtual fact, the fact of nothingness's wholeness, and everything else is built by further such facts.

Unity is therefore also two

The internal structure of unity, being relational, has two terms. Hence unity is *also* duality. (Diary 53B, August 2023: *"One divided is two."* Diary 51, 10 January 2023: *"The paradox of wholeness, of unity, is that it is both one thing and two things. Two things because it is the relationship between one null part and one unified whole."* Diary 053A, 24 March 2023, quoted in ``foundations.md``: *"the universe starts with an Everything that has wholeness, and one dimension that goes straight to its heart, it is both unity, being whole, and zero, being nothing. Both paradoxical and dual, it is in fact, in truth, two."*) Two is not produced by *adding* to one; it is produced by *dividing* one, which is the same thing as recognising the internal structure that unity already has.

This is the seed of the entire number sequence. The detailed working out belongs in ``numerogenesis.md``, but the principle is already here: every number is forced into existence by the paradoxes of the numbers already present, and the first such paradox — the one that forces two — is internal to unity itself.

Unity is unique

There is exactly one unity. (Diary 61, 8 August 2025: *"there can only be one unity – it is self defining."* Diary 064A, 4 April 2026: *"properly there is only one null, and that is the same null that started everything off in the first place."*) Leibniz's Law, applied to wholeness-considered-as-a-feature, forces the identification. If there were two unities, they would by definition share the feature of being-whole; that shared feature, by Leibniz, is one feature; and there is no further feature available to

distinguish them, since by hypothesis they are bare unities with no internal differentiation other than the relating that they constitutively are.

This has a corollary the diaries return to repeatedly: there cannot be a competing Existence. (Diary 61, 8 August 2025.) Any hypothetical "other" Existence would have to be indiscernible from this one in the only feature it could have — namely, being — and by Leibniz's Law that makes it the same Existence. There is no plurality of Existences. There is one Existence, and it is what unity gives rise to.

5. Necessity emerges with unity

One of the items in the eliminative definition of nothingness was *no laws, no rules*. So how does the bootstrap give us a Universe in which any law-like behaviour obtains? Where does necessity come from?

The diary's answer is that necessity is not a pre-existing principle that *makes* the bootstrap happen. Necessity emerges *with* unity, as part of what unity is. (Diary 61, 8 August 2025: *"Necessity emerges alongside Paradox with the initial formation of the null relationship that is something and nothing."*)

The argument: paradox, where it obtains, is unstable. (This is the core thesis of `paradox_and_emergence.md`: paradox cannot persist as paradox; it must resolve.) But paradox-must-resolve is itself a necessity. Where does *that* come from?

It comes from what paradox *is*. To say that A is both X and not-X is to say something that cannot stand. If we further insist on it, we get not stability but the structural collapse-and-overflow that *is* the resolution. The resolution is not optional, because there is no third state available in which the contradiction can be deposited. The resolution is what the paradox structurally amounts to.

So the necessity that paradox must resolve is not imposed *on* paradox by something else; it is internal to what paradox is. And the necessity that the wholeness of nothingness paradoxically implies something is not imposed *on* nothingness by something else; it is internal to what wholeness is. These necessities are not principles standing prior to existence; they are the self-coherence of the situations that the bootstrap brings about.

This is what Virtualism means by saying the laws of logic, the laws of mathematics, and the laws of physics are themselves emergent. They are not pre-existing scaffolding on which the universe is built; they are aspects of *what the universe is*, arriving step by step as the architecture chain unfolds. (Diary 50, 31 October 2022: *"Emergence cannot just happen from possibility, there has to be a forcible cause, so all the ideals do not exist from the beginning. Each number has to be pushed into existing, each law of physics has to emerge as the physics emerges; the two cannot be separate."* Diary 050, 9 November 2022, the "Plato's beard" passage: *"no potential actually exists in truth, or in reality, until the path has been beaten to its door and necessity has birthed it in response to some paradox."*)

6. What the bootstrap is and is not committed to

The argument runs on a thin set of commitments and it is worth being explicit about what they are, because much of the dialectical work in defending the bootstrap is about resisting the temptation to add commitments that look harmless but reopen the regress.

What the bootstrap is committed to

- **An eliminative definition of nothingness.** Nothingness is the state in which *no thing* obtains, and in which there is nothing *over and above* that.
- **The structural claim that wholeness is internal to any totality-of-state.** If nothingness *is what there is*, then nothingness is entire, and being entire is being whole.
- **The principle that paradox is generative.** Where granted principles incompatibly resolve, the resolution overflows into a new dimension. This principle is developed in full in ``paradox_and_emergence.md``; here it is applied to its inaugural case.

That is the entire apparatus the bootstrap requires.

What the bootstrap is not committed to

- **A pre-existing realm of logical or mathematical truths.** The argument does not assume that the laws of logic obtain *as substantive items* prior to nothingness. It assumes only that whatever it means to say "absolute nothingness" carries with it the completeness-claim that the wholeness argument uses. If a

critic wants to call this "smuggling in logic", the reply is that there is nothing to smuggle: the completeness-claim is part of what *the words* "absolute nothingness" amount to. Strip the completeness, and you no longer have absolute nothingness; you have a nothingness leaking somewhere, and the argument runs again on whatever is left.

- **A pre-existing observer.** No one has to be present to register the wholeness. The wholeness is not a perspective on nothingness; it is what nothingness *is*, when nothingness is taken to be absolute.

- **A pre-existing temporal sequence.** The bootstrap does not occur *at a time*. There is no time before nothingness becomes unity; there is no time before unity becomes the first paradox; there is no time before paradoxes have produced numbers. Time itself is a much later emergence (see `time.md`, in prospect). The bootstrap has logical priority, not temporal priority. (Diary 042, 15 October 2020: *"Such a sequence of preceding causes cannot be infinite ... NB. This in no way implies any involvement of time."*)

- **A pre-existing space, set of fields, vacuum, or other structure.** The bootstrap is *thinner* than any physical model of cosmogenesis. It does not produce the Big Bang directly. It produces unity, which then produces number, which (much later) produces space and matter (see `numerogenesis.md` and `gravity_and_space.md`, in prospect). The Big Bang sits at the end of a long chain whose first step the bootstrap supplies.

The bootstrap is, in this sense, the *minimum* claim Virtualism

needs. Anything weaker would not produce a first existent; anything stronger would smuggle the very items the argument is meant to derive.

7. Why the alternatives fail

Four alternative positions are worth registering, because each is the most natural reply to the bootstrap and each, on inspection, fails on its own terms.

The probabilistic deflation (van Inwagen)

The first alternative is contemporary and analytically sharp. Peter van Inwagen, in *Why Is There Anything At All?* (1996), argues that the question dissolves once we consider it probabilistically. There is only *one* way for there to be nothing — total absence — but there are *infinitely many* ways for there to be something. If we treat each way as equally possible, the prior probability of *nothing* is zero. The question why-something-rather-than-nothing turns out, on this analysis, to be like asking why a randomly chosen real number is non-zero: *of course* it is, because the non-zero options exhaust almost the entire space.

The objection is elegant and the dissolution is tempting. It is also wrong, in a way that bears directly on what Virtualism is committed to.

The problem is that probability is the wrong tool for ontological genesis. Probability operates on a space of pre-existing possibilities; it tells us how to weight the members of an already-

given space. The question of where the space itself comes from cannot be answered by counting the members of it. Van Inwagen's argument tacitly presupposes that the infinitely-many-ways-of-being-something are already in some sense **available** to be counted, weighted, and compared with the one-way-of-being-nothing. But the availability of that space is exactly what the original question was asking after. If the space is not available — if there is genuinely nothing, including no menu of possible somethings — then there is no probability calculation to run.

More structurally: probability is the regime of **hypodox** — underdetermined situations where multiple admissible arrangements are available and one of them obtains. It permits selection within existing dimensions. It does not create dimensions. (See ``paradox_and_emergence.md`` §§7–8 on the asymmetry between paradox and hypodox; weak emergence is the hypodox regime, and weak emergence is rearrangement within existing structure, not the production of new structure.) Only **paradox** — the full incompatibility that forces resolution — has the structural commitment required to produce ontological novelty **ex nihilo**. Probability can shift weight around within a possibility-space; only paradox can call a possibility-space into being.

This is the same structural point that obtains throughout the ontology. A photon's commitment to space is total — 100% — and that total commitment is what makes it the carrier of spatial relationships at all. Anything less than full commitment is rearrangement within existing structure. The bootstrap requires full commitment of the same kind: not a probabilistic preference for something over nothing among a pre-existing menu of options, but the **forcing** of unity by a paradox that admits no other

resolution. Van Inwagen's argument is probabilistic where the situation is paradoxical, and that is why it fails to do the work the question demands.

The 1-degree rotation sharpening

The probabilistic position has a tempting last-ditch defence. It might be granted (the van Inwagen-style theorist could say) that *total* novelty — the creation of a new dimension from nothing — cannot be handled probabilistically; but small departures from an existing state are easy. A one-degree rotation into a new dimension is a very small change. Surely something that small can be handled by probability?

It cannot, and the reason is structurally important. To rotate by one degree into a new dimension requires that the dimension *already exist* to rotate into. The existence of a dimension is binary: it either exists or it does not. There are no fractional dimensions, and there is no partial existence of a dimension. Once a dimension exists, rotations within it can be of any magnitude, including arbitrarily small ones; but the *erection* of the dimension is a 100% commitment regardless of how small the subsequent rotation turns out to be.

Probability operates *within* existing dimensions, on magnitudes, distributions, and arrangements. It cannot create the dimension that those magnitudes and distributions are dimensions *of*. To make a probabilistic argument for a 1-degree rotation into a new dimension is to help oneself to the dimension's existence as background, and then to assess the rotation's likelihood against that background. The background is exactly what was at issue.

This is why probability is the wrong tool for ontological genesis at *every* stage of the architecture chain, not just at the bootstrap. Every new dimension that comes into being requires the same 100% commitment — the full 90-degree orthogonal act of creation, in geometric terms — regardless of whether the subsequent activity within the dimension is large or small. Probability can shift weight around once a dimension is in place; only paradox can erect the dimension in the first place. The 1-degree rotation generalises: dimensionality is not a matter of degree, and probability is not a tool that can create what it presupposes.

A subsidiary point worth registering: van Inwagen takes the question seriously, and this is to his credit. He is not among those who dismiss it as malformed. The disagreement is not over whether the question is genuine; it is over whether the question admits of a *real* answer or only a deflationary dissolution. The Virtualist position is that the question is genuine *and* admits of a real answer, and that the bootstrap is that answer.

The infinite past

The first alternative: there is no first existent, because the past is infinite. There has always been something, and there is no "how did it start?" because it never started. The cosmological versions of this include eternal inflation, certain ekpyrotic scenarios, and the older steady-state universe.

The diaries reject this on logical, not empirical, grounds. The argument has been stated repeatedly (Diary 041, 15 July 2020; Diary 045, 26 September 2021; Diary 042, 15 October 2020). The

shape of the argument:

- A causal sequence is a sequence of changes leading from one state to another.
- For any moment to be the present moment, it must be reachable from the start of the sequence by counting forward through the changes.
- An infinite causal sequence has no start, by definition.
- Therefore no moment within it is reachable from its start.
- Therefore there is no "present moment" — which we know there is.
- Therefore the causal sequence is not infinite.

The argument is not that infinity is *unintuitive*. The argument is that an infinite causal regress is *structurally incoherent* in exactly the way Zeno's paradox is sometimes presented as showing about motion: an infinite series of preceding steps has no anchor from which to step forward, so the present never arrives.

The standard reply — that the series of past moments is not required to start anywhere, since it has been counting "all along" — begs the question. There is no "all along" in a series that has no start. The argument turns on the *causal* sequence, not on a mathematical numbering of moments that one is free to extend indefinitely in either direction. Causes must do work; they cannot do that work from infinitely far away.

The diary's diagnosis is sharp: *"Infinite Regress gives many people cause for concern, and quite rightly, as there is a definite impossibility about progressing from the start of an IR, which implies no start, hence the fallacy of the whole shebang."* (Diary 041, 17 July 2020.) Infinite *progress* — counting onward without

end from a defined start — is unproblematic; infinite *regress* — counting backward through a sequence with no start — is incoherent.

The brute fact

The second alternative: there is something, and there is no explanation; somethingness is just the way things are, and the question *why* admits of no further answer. This is the brute-fact position. It is the philosophical analogue of the cosmological brute Big Bang.

This is intellectually honest as a refusal; it is not an explanation. (Diary 046, 25 October 2021: *"Such objects would have to be contingent on objects that had no totality, and that really makes no sense. Or else they simply pop into existence from what? From nowhere? Or they just are? No, absolutely not!"*)

The Virtualist objection is that the brute-fact position is more expensive than the bootstrap. The bootstrap derives the first existent from a stringent definition of nothingness and the generic mechanism of paradox-driven emergence — that is, from machinery that has to be there *anyway*, because the same machinery is required for every subsequent emergence in the architecture chain. The brute-fact position has to *additionally* assert that the first existent is exempt from the explanatory demands that apply to everything else. That exemption is itself a piece of metaphysical structure, and it is harder to motivate than the bootstrap argument it replaces.

Theological grounding

The fourth alternative: there is something because there is a Necessary Being whose nature is to exist, and that Necessary Being is what classical theology calls God. David Bentley Hart and Alexander Pruss give contemporary versions of this position. (Diary 046, 25 October 2021, engages with Hart directly; Pruss's **Necessary Existence** (2018, with Rasmussen) is the most rigorous recent analytic defence of the modal cosmological argument.)

The bootstrap has no quarrel with the **structure** of this argument. It is, in its own way, also a Necessary-Being argument: it identifies a necessary first existent (unity) and shows why it must obtain. The disagreement is about **what** the necessary first existent is. The theological version says it is a god, with intellect, will, and (in most traditions) personal characteristics. The Virtualist version says it is bare unity — the wholeness of nothingness, no more.

The Virtualist objection is that the extra content — intellect, will, personality, intentionality, providence — is not derived from the necessity that gets the argument going. The argument earns **something**; theological versions then take the opportunity to load that something with attributes that have no warrant in the argument itself. The move from "there is a necessary first existent" to "that necessary first existent has the attributes of the God of classical theism" is undischarged. The bootstrap, by contrast, delivers the **thinnest possible** first existent — pure unity, nothing more — and lets the architecture chain do the work of producing everything else. Where Virtualism arrives at structures in the universe that **look like** what religious traditions have called meaning, value, or even soul, those structures are emergent products of the chain, not properties of the first existent.

The diary's verdict on the move from necessity to deity is unsparing: theological grounding helps itself, without warrant, to exactly the content that distinguishes a religious cosmology from a philosophical one. Diary 046, October 2021, on Hart: "He then waffles a lot about God, without making any meaningful sense that I can comprehend." The diagnosis is not that the theist's first move (something necessary must exist) is wrong; it is that the second move (and that something has the attributes of God) is a free lunch dressed up as an argument.

(There is a separate question, downstream of this one, about whether the architecture chain ultimately produces anything that deserves the name *God* or *spirit*. That question belongs in the Spirit project, not here.)

8. The status of the argument

The bootstrap argument is offered as a *demonstration*, not as a preference among options. The claim is not that the bootstrap is the most attractive of the available stories of origin; the claim is that the alternatives are independently defective and the bootstrap is independently sound.

This is a strong claim. The diary recognises it. (Diary 064A, 4 April 2026: "There is only one path from nothing to something, and that is the path described by Virtualism.") It is consistent with the Virtualist methodological position registered in `\paradox_and_emergence.md` §6` — the *a priori derivability commitment* — that what is possible for Existence is in principle

derivable from the nature of virtual relationships alone. The bootstrap is the first such derivation, and the test case for whether the derivability commitment can in fact be discharged.

That said, two qualifications are in order.

First, the bootstrap is **thin**. It delivers unity, and it demonstrates the mechanism by which paradox produces emergence. It does not, by itself, deliver the natural numbers, space, time, matter, or any of the other items the full theory is committed to. Those come from running the mechanism repeatedly on the situations the previous step has produced. That work is done in ``numerogenesis.md``, ``gravity_and_space.md``, ``time.md``, and the architecture chain document (in prospect). The bootstrap is the first move only.

Second, the bootstrap is **self-applying** in a way that some critics will find suspicious. The argument uses the principle that paradox is generative; the paradox of nothingness is the inaugural case of that principle; so we appear to be applying the principle to its own inaugural application. The diaries note the structure without flinching (Diary 050, 29 October 2022: *"Paradox is emergence. The cause and effect are one. They only take on the appearance of separateness when observed from a distance, such as the distance of imagination."*). The structural reading: the principle that paradox-must-resolve is not a **separate** premise applied to nothingness from outside; it is **part of** what nothingness's paradoxical situation amounts to. The self-applicability is not a defect but a feature — it is what makes the bootstrap a bootstrap and not a deduction from pre-existing axioms.

9. The mathematical face of the bootstrap: $0^0 = 1$ and the structure of powers

There are two independent paths from nothingness to unity, and they converge on the same result. The first, developed in §§3–4 above, runs through the relational structure of nothingness: that nothingness, taken absolutely, has the property of wholeness, and wholeness *is* something, namely unity. The second is mathematical and runs through the identity $0^0 = 1$, considered against the broader background of how powers behave when base and exponent are small. The diaries register both paths (Diary 064B, 17 May 2025; Diary 61, 5 September 2025), and recognise that they are not separate pieces of evidence for separate claims but two angles on the same structural fact.

This section sets out the mathematical path, the structural identification between the two, and a deeper observation about how the architecture of powers itself maps onto the architecture chain.

The special case: $0^0 = 1$

The result that matters most for the bootstrap is the special case in which both base and exponent are zero — nothing considered through the operation of nothing. The diary's formulation is precise:

- > *Nothing multiplied by nothing no times is something ... Or put
- > another way, nothing not multiplied by nothing is something.*
- > (Diary 064B, 17 May 2025.)

What makes the special case load-bearing is the **coincidence** of base and exponent. The bootstrap argument is about nothingness considered as itself — there is no external operator standing outside nothingness, applying some operation to it. The base **is** nothing; the operation **is** nothing; and the result is unity. The mathematical situation mirrors the ontological one exactly: nothing operating on itself through nothing yields unity. This is the bootstrap in arithmetic vocabulary.

The general identity $x^0 = 1$, for $x \neq 0$, is a related fact but a different one. It says: anything raised to no power is unity. That is true and structurally important (see below on what it says about **being-considered-as-itself**), but it is not the bootstrap-specific result. The bootstrap requires the **self-applying** case, where what is operated on and what does the operating are the same nothing.

Why $0^0 = 1$ is constitutional, not conventional

The identity $0^0 = 1$ follows from what raising-to-a-power is when its arity goes to zero. x^n is the product of n copies of x ; x^0 is the product of zero copies of x ; and the product of zero copies of **anything** is the multiplicative identity, which is one. This is the **empty product** construction, and it is not a convention adopted for convenience. It is what multiplication structurally is when its arity goes to zero. The result is forced; it cannot be otherwise without breaking the algebraic structure that defines what multiplication does.

The same result is approached in the limit: as the base tends to

zero with the exponent already at zero, the function value remains at unity. The empty-product construction and the limiting construction converge on the same value because they are two views of the same structural fact about what multiplication does at its degenerate point.

There is a body of mathematical literature in which 0^0 is treated as undefined or context-dependent, primarily because the two-variable function x^y has a discontinuity at the origin (different limiting paths give different results in some treatments). The Virtualist position is that this is the wrong reading. The discontinuity is not a defect of the identity $0^0 = 1$; it is a consequence of imposing two-variable continuity requirements on a function whose behaviour at the origin is determined by what the empty product *is*. The convention-versus-fact question dissolves once we see that the identity is not a stipulation but a derivation from what multiplication structurally is.

The Virtualist commitment, which the diary registers and which this document deploys, is that the primitive mathematical operations are not human inventions imposed on a passive nature. They are *constitutionally derived from nature, by nature, for nature*. The structure of multiplication, addition, and the relations among numbers reflects what being-and-relating structurally are. If $0^0 = 1$ follows from what multiplication is, and what multiplication is follows from what being-and-relating is, then $0^0 = 1$ is a constitutional fact about being. The mathematical identity is the trace, at the level of numerical fact, of the same structural truth that the relational argument expresses at the level of ontology.

The structural identification

The mathematical special case says: *nothing, operated on by nothing, is unity*. The relational argument says: *nothingness, taken in its totality, is whole, and that wholeness is unity*.

These are the same claim under two descriptions.

To see this, consider what 0^0 amounts to operationally. With no factors to combine and no operator standing outside, what remains is the bare structural fact that there is an operation-shaped hole where multiplication might have been, applied to a content-shaped hole where a number might have been, and what comes out the other side is unity. The unity is not produced *by* multiplication doing its work; there is no work for it to do.

The unity is what is *left* when the operation reduces to its degenerate case — the identity element under multiplication, the multiplicative one.

This is exactly what the relational argument says about nothingness. There is no act of "making" nothingness whole; there is no operator outside nothingness imposing wholeness on it. The wholeness is what is *left* when nothingness is taken as itself, in its totality — the bare fact that nothingness, as nothingness, is *one thing*. Wholeness is the ontological identity element, just as one is the multiplicative identity element. They are the same fact, viewed through the lens of being and the lens of operation respectively.

Powers and dimensions: the deeper structure

There is a further observation that the diary material gestures at but which is worth stating explicitly, because it shows that the mathematical face of the bootstrap is not isolated — it is the first step in a *mathematical sequence* that runs parallel to the ontological architecture chain. The observation concerns how powers behave for different bases.

- **Powers of 0** give 1 (in the special case of 0^0). This is unity *without* extension — dimensionless existence. There is being, but no dimension along which being can vary. The bootstrap delivers this state.

- **Powers of 1** all give 1. Every power of unity is unity: $1^n = 1$ for every n . A single dimension exists — the dimension of integer count — but raising-to-a-power does no productive work within it. One taken any number of times is still one. This is the regime of pure identity, the *fire* element in the diary's elemental vocabulary: one-to-one, sameness preserved under operation. (Diary 042's "fire is the element of unity.")

- **Powers of 2 and higher** are where multiplication starts to *do* something. $2^2 = 4$, $2^3 = 8$, $3^2 = 9$. Squares generate area, cubes generate volume, and each new power constructs a new dimensional structure. This is where the squares-and-roots paradox material of Diary 042 kicks in: by the time we have reached 5 in linear count, we are committed to 9, 16, and 25 as squares — but those numbers do not yet exist as objects in the linear sequence. The paradox is the production of two-dimensional numerical fact from one-dimensional resources.

The progression in arithmetic — *no dimension* ($0^0 = 1$), *one*

trivial dimension* ($1^n = 1$), *productive multi-dimensionality* ($2^n, 3^n, \dots$) — mirrors the early stages of the ontological architecture chain: from the bootstrap's dimensionless unity, to the single linear dimension of natural-number sequence, to the production of genuine new dimensions through the paradoxes of geometric numbers. The arithmetic is not an analogue of the ontology. It is the *first instances* of the ontology, expressed in numerical fact, because numbers are themselves virtual facts and the operations on them are constitutional facts about being-and-relating.

This is one of the things that makes Virtualism distinctive. The typical move in philosophy is to treat mathematics as a model that *describes* metaphysical structure, with the description being more or less faithful depending on which philosophy of mathematics one prefers. The Virtualist move is to treat mathematical structure as one of the *manifestations* of metaphysical structure, at the level of pure numerical fact, without intermediation by description. Mathematics is not how we talk about being; mathematics is one of the things being is, in its bare numerical aspect. The architecture of powers is not a *model* of the architecture chain; it is the architecture chain *in its arithmetic aspect*. (The full development of this position belongs in `numerogenesis.md` and in the prospective `mathematical_facts.md`; the present document deploys it without fully arguing for it.)

Why this strengthens the bootstrap

The mathematical face matters not because it provides extra *evidence* — the relational argument stands on its own — but

because it changes what kind of move the bootstrap *is*.

If the bootstrap were only a relational argument, it would be specific to ontology and would have to defend itself in a neighbourhood (analytic metaphysics) where its style of move is unfamiliar. The mathematical face shows that the same shape of move occurs at the foundations of mathematics, where it is forced by what multiplication is. The bootstrap is not a one-off oddity invented to solve a metaphysical puzzle; it is the first instance of a structural pattern visible throughout arithmetic, with the dimensionless-unity \rightarrow one-dimensional-identity \rightarrow multi-dimensional-product progression mirroring the architecture chain at the level of numerical fact.

This is the Virtualist signature: the same engine running at different scales. Leibniz's Law operates from the foundations of ontology to the indistinguishability of electrons. Paradox-forces-resolution operates from the bootstrap of unity to the emergence of consciousness. And the structural pattern of *being-considered-through-its-own-degenerate-case yields unity* operates from $0^0 = 1$ at the arithmetic floor to the wholeness of absolute nothingness at the ontological floor. The recurrences are not accidental; they are evidence that the same basic structure is in play at every level, which is what the theory predicts.

For the Acta paper, the mathematical face is worth deploying with some care. Analytic philosophers will resist a move *from* mathematical fact *to* metaphysical conclusion, on the standard ground that mathematical identities are about mathematical objects, not about being as such. The reply is that Virtualism

denies the separation — mathematical objects *are* virtual facts, and virtual facts are what being consists of. But this is a controversial enough commitment that it should be argued for separately rather than smuggled in via the mathematical identity. In a public-facing presentation, the safest deployment is: *the relational argument carries the weight; the mathematical identity shows that the structural shape of the argument is not a metaphysical eccentricity but the first step in a recurrent pattern, observable at the foundations of arithmetic*. That gets the illumination without overcommitting the reader.

10. How this connects to the rest of the theory

The bootstrap is the first step of the architecture chain. The chain runs (using the rough form already in the project instructions and `\paradox_and_emergence.md`):

> nothing → unity → number → space → matter → gravity → time →
> consciousness

Each arrow is a paradox resolved. The present document delivers the first arrow, *nothing → unity*. Subsequent documents deliver subsequent arrows:

- `\numerogenesis.md` will deliver *unity → number*. The seed is already here: unity is intrinsically dual; that duality is the paradox that forces two; two forces three; and so on inductively. The full development handles squares, ratios, geometric numbers, and the strong/weak distinction at the square-of-two threshold.

- `gravity_and_space.md` will deliver the *number → space → matter → gravity* segment. Space emerges from numerical differences; matter from higher-dimensional numerical fact compressed into three spatial dimensions; gravity from the paradox of compressed higher-dimensional fact.
- `time.md` will deliver the *gravity → time* segment, building on the foundations' true/factual/real/ideal apparatus and on the Now-as-universal claim.
- The crossover into Iconism — the *time → consciousness* segment — is registered here but is the business of Tier 2, not Tier 1.

The bootstrap also has direct connections to several positioning documents:

- `positioning_existence_and_dimensions.md` argues that Virtualism does not pick a corner of the Materialism/Idealism/Dualism trilemma because there is one ontological category — Existence — internally differentiated by dimension and emergence. The bootstrap supplies the *single ontological category*: it derives bare Existence (unity) from absolute nothingness, and shows that everything else is differentiation *within* that category. There is no second category lying in wait, because there was no second starting point for one to arise from.
- `positioning_causation_and_relations.md` argues that causation is the changing of facts; facts are virtual relationships; and the standard accounts are accounts of how this changing presents

itself, not of what it is. The bootstrap is the first such causal event — the first fact-change — and gives the cleanest case of the structure the positioning note describes.

- `positioning_verlinde_and_emergent_gravity.md` argues that Virtualism and Verlinde-style emergent-gravity programmes agree that gravity is emergent but disagree about what it emerges from. The deeper disagreement, which the bootstrap brings into view, is that Verlinde takes information, holographic screens, and a thermodynamic substrate for granted and emerges gravity from them; Virtualism emerges *everything*, including the numerical substrate, from a bootstrap that requires nothing to be granted. The difference of depth is the difference of starting point.

11. Status and open questions

Status

The bootstrap argument is firm. It is consistent across the diary corpus from Diary 036 (April 2019) to Diary 064B (May 2025), with the formulations sharpening rather than shifting. It is self-contained: it depends on the eliminative definition of nothingness and on the generic paradox-and-emergence apparatus developed elsewhere, but on nothing else. It supplies what `foundations.md` and `paradox_and_emergence.md` jointly require for their starting points to be earned.

A summary paragraph for command's `theory_current_state.md`:

> *Virtualism's first move is the bootstrap argument from

> absolute nothingness to unity. Absolute nothingness is defined

> eliminatively: no universe, no God, no time, no space, no laws,

> no numbers, nothing. Yet absolute nothingness, so defined,

> carries the property of wholeness — to be all there is, even

> when that is nothing, is to be entire. This is a paradox in

> the generic sense (granted principles incompatibly resolve),

> and paradox is generative: it overflows into a new dimension.

> The new dimension here is the dimension of being itself. The

> resolution is unity — the relationship between nothingness and

> its own wholeness — which is structurally also two (the

> relating of nothingness and wholeness) and which contains the

> seed of every subsequent number and every subsequent emergence.

> Unity is unique by Leibniz's Law; necessity emerges with it,

> not before it; and the bootstrap is the inaugural case of the

> mechanism that the rest of the theory runs on at every level.

> The argument has a second, independent derivation in the

> mathematical identity $0^0 = 1$ — nothing operated on by nothing

> yields unity — which the diary takes (rightly) as the

> mathematical face of the same structural fact. The architecture

> of powers itself maps onto the early architecture chain:

> dimensionless unity at 0^0 , single trivial dimension at 1^1 ,

> productive multi-dimensionality at 2^n and higher. Three

> contemporary alternatives fail on their own terms: van

> Inwagen's probabilistic deflation requires a possibility-space

> the bootstrap is meant to derive and, in its 1-degree-rotation

> form, presupposes the dimensionality it claims to access; the

> infinite-past position requires a causal sequence with no

> anchor; theistic Necessary-Being arguments earn necessity but

> smuggle in divine attributes the argument does not warrant.*

Open questions

- **The exact relation between the bootstrap and the four determination cases.** The argument treats the paradox of nothingness as overdetermination (the fourth case in paradox_and_emergence's revised taxonomy). But the situation prior to the bootstrap is, by definition, **non-determined** (the zeroth case — no relationship beyond bare co-existence). The move from non-determined to overdetermined in the inaugural case has a slightly unusual shape: there are no co-existents to begin with, but the stipulation of completeness **is** a relation, in effect, between nothingness and its own totality. This is worth working out in finer detail, possibly in the `architecture_chain.md` or `mandala_framework.md` document when that is written.
- **Logical priority versus temporal priority.** The bootstrap is said to have logical priority, not temporal priority, because time itself is a much later emergence. But the diary sometimes uses temporal-sounding language ("before the Big Bang", "first came nothingness, then unity"). The position is that this is unavoidable shorthand and not load-bearing — the **order** is the logical-derivation order, not a temporal sequence. A clean statement of this distinction, possibly with an explicit warning about the limits of temporal-sounding language at the pre-temporal stages, would be useful for the Acta paper. Flagged as needing care in any public-facing presentation.
- **The deeper case for mathematical truths as constitutional facts about being.** §9 argues that $x^0 = 1$ is a constitutional fact derived from what multiplication structurally is, rather

than a mathematical convention. This depends on the broader Virtualist commitment that mathematical truths are not human conventions but virtual facts about being-and-relating. The commitment is registered in `foundations.md` §7 and developed partially in `paradox_and_emergence.md`, but the full argument — engaging the philosophy-of-mathematics literature on formalism, structuralism, fictionalism, and platonism — has not been written. A dedicated note (`mathematical_facts.md`, in prospect) would do this work; in the meantime, the present document deploys the constitutional reading without fully defending it. Flagged as open.

- **Engagement with the cosmological literature.** The bootstrap is offered as a logical derivation, not a physical cosmological model. But contemporary cosmology has many proposals for pre-Big-Bang structure (eternal inflation, ekpyrotic models, cyclic models, the no-boundary proposal). A separate engagement note may be wanted, distinguishing the *logical* bootstrap from any specific *physical* cosmological proposal and showing how the bootstrap is upstream of all of them.

- **Engagement with van Inwagen and Pruss specifically.** The treatment in §7 sketches the structural objection to van Inwagen's probabilistic deflation (probability cannot create the possibility-space it operates on) and to Pruss-style theistic Necessary-Being arguments (the move from necessity to divine attributes is undischarged). Both deserve fuller treatment in a dedicated positioning note, especially for the Acta paper, where situating Virtualism in relation to the most prominent contemporary analytic positions is part of the framing work. Van Inwagen is the more pressing engagement

because his style of argument is closer to the analytic audience's expectations and the response to it is more technically interesting; Pruss can be handled more briefly because the structural objection (illicit content-loading) is the same as the objection to Hart and other classical theists.

Candidate aphorisms

For the bank:

- "There is only one path from nothing to something, and that is the path described by Virtualism." (Diary 064A, 4 April 2026.)
- "Paradox is emergence. The cause and effect are one." (Diary 050, 29 October 2022.)
- "Nothing actually is factually wholeness." (Diary 063C.)
- "One divided is two." (Diary 53B, 7 September 2023.)
- "Any explanation has to be one that bootstraps existence." (Diary 60C, 29 June 2025.)
- "Roots exist before their power exists." (Diary 042, 13 October 2020.)
- "Existence abhors a vacuum as much as does Nature." (Diary 042, 13 October 2020.)
- "Nothing not multiplied by nothing is something." (Diary 064B, 17 May 2025 — the mathematical face of the bootstrap.)
- "Anything raised to no power is unity." (Author formulation, May 2026; the general identity.)
- "There are no fractional dimensions. To rotate by even one degree into a new dimension requires the full 90-degree orthogonal act of creation, and only paradox has the persuasive power to achieve that." (Author formulation, May 2026; against van Inwagen.)

The bootstrap is now in place. The next thread document — numerogenesis.md — can take unity as given and develop the production line of the natural numbers, the geometric numbers, and the threshold between strong and weak emergence at the square-of-two.