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IS HEALTH TECHNOLOGY ASSESSMENT A BUREAUCRATIC
CONFIDENCE TRICK?

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ABSTRACT

The modern practice of health technology assessment (HTA) has evolved into a system that resembles, in structure and function, a bureaucratic confidence trick. This is not because its practitioners are deceptive, but because the field has institutionalized a methodological framework that creates the appearance of scientific measurement while resting on foundations that cannot withstand scrutiny. History provides numerous parallels: medieval scholasticism, the epicycle-laden Ptolemaic cosmos, and nineteenth-century phrenology all persisted through the collective confidence of communities convinced by internal coherence rather than empirical adequacy. HTA follows this pattern with striking fidelity.

At the center of the illusion is the reference case. By prescribing the use of utilities, QALYs, simulation modelling, and incremental cost-effectiveness ratios, the reference case guarantees the production of a numerical output; irrespective of whether the inputs are measurable. Utilities derived from time trade-off, standard gamble, EQ-5D, AQoL and similar instruments are ordinal scores; they rank health state descriptions but do not quantify differences. Ordinal scores cannot support arithmetic. Yet HTA treats them as interval measures, multiplies them by time, embeds them in lifetime models, and presents the resulting artefacts as evidence. No HTA agency has demonstrated that these numbers correspond to quantities or satisfy the axioms of representational or Rasch measurement theory.

The confidence mechanism persists because the system rewards procedural compliance, reproduces itself through guidelines, education, and publication norms, and provides bureaucracies with an administratively useful, but scientifically empty: numerical veneer for rationing decisions. The method survives because it is usable, not because it is valid; because it enables decisions, not because it measures value.

This paper analyses the origins and persistence of the HTA confidence mechanism and demonstrates how a measurement-based HTA, grounded in manifest ratio scales, Rasch-derived interval measures, and protocol-driven value claims, offers the only route out of the illusion and toward a scientifically credible evaluative framework.

INTRODUCTION: CONFIDENCE TRICKS IN THE HISTORY OF SCIENCE

The history of science contains episodes in which error persisted not through malice or conspiracy but through the collective confidence of communities convinced of their own reasoning. In medieval scholasticism, elaborate systems of doctrine were defended with extraordinary technical sophistication, even as the empirical world was excluded from their foundations ¹. In early astronomy, the Ptolemaic system survived for centuries by accumulating epicycles, mathematical devices that gave the impression of increasing precision even as they masked the model's departure from observational reality ². In nineteenth-century phrenology, cranial measurements were treated as quantitative indicators of character, intellect, and moral disposition, despite the absence of any measurable attribute corresponding to the claims. These episodes were not deliberate frauds; they were systems sustained by cognitive closure, institutional habits, and the reassuring power of numerical form.

It is in this sense, not as deliberate deceit but as a structural illusion, that the modern practice of health technology assessment (HTA), and particularly the reference case used by agencies such as PBAC in Australia and NICE in the UK, can be described as a bureaucratic confidence trick. The term may appear provocative, yet its meaning is precise: a confidence trick is a system that induces belief in the validity of its operations through the appearance of coherence, technical form, or authority, even when its foundations are hollow. The power of such a trick lies not in deception but in consensus; the illusion is sustained because all participants assume that someone, somewhere, has verified the assumptions on which the system rests.

HTA fits this structure with astonishing fidelity. The QALY, utilities, and simulation models project an impression of measurement and scientific precision. They are expressed as numbers, plotted on curves, manipulated arithmetically, and presented within formal guidelines. Yet no agency has ever demonstrated that the numbers correspond to measurable quantities. The system persists because it produces outputs that bureaucracies find useful, not because those outputs have scientific validity. In this paper we examine how HTA came to function as a confidence mechanism, why its epistemic flaws remain invisible to its practitioners, and how a new measurement-based HTA can bring the illusion to an end.

DEFINING A CONFIDENCE TRICK IN THE CONTEXT OF SCIENCE AND BUREAUCRACY

A confidence trick, in the sociological sense, is not a deception perpetrated by an individual but a mechanism through which institutions generate belief in the validity of practices whose foundations cannot withstand scrutiny. It relies on three elements. First, it must produce a surface appearance of legitimacy, typically through numerical precision, technical vocabulary, or procedural form. Second, it must suppress or obscure the questions that would expose the foundational weakness of the system. Third, it must operate within a network of mutual reinforcement, where practitioners, reviewers, policymakers, and institutions assume that others have already validated the underlying assumptions.

In science, such tricks often arise when communities mistake internal coherence for empirical adequacy. When numbers are generated, plotted, and compared, they acquire an aura of authority

even if they have no relation to measurement. This is why measurement theory, representational measurement theory for manifest attributes, Rasch measurement for latent constructs, is essential^{3 4} Without the axioms that allow numbers to be treated as quantities, numerical operations are mere decoration. A system that mistakes decoration for substance is vulnerable to the creation of confidence mechanisms.

In bureaucracy, the logic is slightly different but fully compatible. Bureaucracies require closure: decisions must be made, resources allocated, and policy justified. When confronted with complexity, uncertainty, or moral ambiguity, bureaucratic systems often adopt quantitative devices that provide an illusion of objectivity. The numbers do not need to be valid; they need to be manageable, comparable, and defensible. A confidence trick emerges when the numerical framework used to support decisions is treated as scientific evidence even though it rests on no measurable foundation.

HTA is a hybrid of scientific ambition and bureaucratic necessity. It uses numbers and models to create an image of quantification, yet the purpose of the numbers is administrative, not epistemic. The reference case mandates a framework that guarantees the production of a single figure, the incremental cost-effectiveness ratio, irrespective of whether the inputs are meaningful or the arithmetic is lawful. The result is a system that is trusted because it is systematic, not because it is true.

THE ANATOMY OF THE HTA CONFIDENCE TRICK: HOW THE ILLUSION IS BUILT

The reference case at the heart of modern HTA is the operational engine of the confidence mechanism. It requires analysts to follow a canonical sequence of steps: choose a utility instrument, derive utilities, calculate QALYs, construct a model, and generate cost-effectiveness ratios. Each step appears scientific. Each step produces numbers. Each step conveys the impression of methodological rigor. Yet at every stage the foundations are conceptually void.

Utilities, whether derived from time trade-off, standard gamble, EQ-5D, AQoL, or any other preference-elicitation method, are ordinal scores. They rank order states but do not measure differences or magnitudes. As made clear by Stevens in 1946, ordinal numbers cannot support addition or multiplication⁵. As Krantz, Luce, Suppes, and Tversky formalized in 1971, numbers can only function as quantities only if they satisfy the axioms of representational measurement theory. Preference scores do not satisfy these axioms. They have no dimensionality, no invariance, and no evidence of a quantitative attribute underlying the responses.

Yet the reference case instructs analysts to multiply these ordinal scores by time, producing QALYs⁶. Because time is a ratio measure, the resulting quantity appears plausible. But the multiplication is meaningless; it is arithmetic applied to ordinal non-quantities. This is the first layer of the confidence trick: an impossible operation dressed in the language of scientific computation.

The second layer is modelling. The reference case then requires the construction of a decision tree or Markov model, often extended to lifetime horizons and populated with transition probabilities,

survival extrapolations, and probabilistic sensitivity analyses. These models generate curves, distributions, and numerical ratios, all of which reinforce the illusion that something has been measured. But the models inherit the impossibility of their inputs. They produce numerical artefacts, not empirical predictions. Their precision is simulated; their complexity is a mask.

The third layer is institutional reinforcement. HTA agencies, academic departments, journals, and industry adopt the reference case as the unquestioned standard. Analysts who follow the template are rewarded with publication, funding, and regulatory compliance. Those who question the foundations face marginalization. This social reinforcement ensures that the trick becomes invisible to those who enact it. The illusion becomes the method; the method becomes the field.

HOW THE REFERENCE CASE OPERATES AS A BUREAUCRATIC CONFIDENCE TRICK

The reference case is the structural mechanism through which the confidence trick of HTA becomes operational. It is not a neutral summary of best practice; it is the codification of a specific epistemic posture. By prescribing, in detail, the steps that analysts must follow, the reference case ensures that the system generates a numerical output regardless of whether the underlying constructs are measurable. It is an engine designed to produce a number; not a truth.

To see how the mechanism functions, one must consider its architecture. The reference case establishes a mandatory sequence: identify a utility instrument, derive utilities, model clinical pathways, calculate QALYs, apply discounting, conduct sensitivity analyses, and present an incremental cost-effectiveness ratio. Each step performs a rhetorical function. Utility instruments create the impression that health can be quantified. QALYs create the appearance of aggregating quality and time into a single metric. Models create the illusion of prediction. Sensitivity analyses create the appearance of acknowledging uncertainty. The output, a cost per QALY, appears to be a scientifically derived measure of value.

But the confidence mechanism works because the system never asks the only question that matters: whether the inputs are quantities that are lawful measures. Without that question, the sequence cannot fail. Ordinal preferences produce utilities; utilities multiplied by time produce QALYs; models translate QALYs into ratios. At no point does the reference case require demonstration that any of these steps are empirically or mathematically justified. The validity of the process is assumed by procedure, not demonstrated by evidence.

What makes this a bureaucratic confidence device, rather than merely a methodological flaw, is that the reference case substitutes procedural compliance for scientific verification. If a submission follows the template faithfully, the result is accepted as evidence. The method becomes self-validating. And because agencies, reviewers, academics, and policymakers operate within the same template, the illusion of validity is continuously reinforced.

This is the same mechanism that allowed medieval scholasticism to sustain its intellectual authority: certainty was generated by adherence to form, not correspondence to reality. The reference case is a modern version of that form; an epistemic apparatus that transforms non-measurable inputs into authoritative decisions through the power of ritualized procedure.

THE PSYCHOLOGY OF INSTITUTIONAL CERTAINTY: WHY THE TRICK IS BELIEVED

A confidence trick requires not deception but belief. It functions because its participants become convinced that the system is legitimate, even when the system contradicts the foundations of measurement and scientific inquiry. In HTA, this belief arises from at least four mutually reinforcing psychological and institutional conditions.

The first is cognitive sequestration. Analysts trained exclusively in utilities, QALYs, and modelling lack the conceptual framework to identify the core error. Without exposure to representational measurement theory and the complementary Rasch measurement they interpret the QALY not as an assumption but as a fact. They assume that each methodological step is grounded in science because they have never been taught to consider the possibility that the field rests on ordinal data masquerading as measurement. In particular, following Stevens (now 80 years ago) neither they nor their instructors have been taught the measurement standards that make arithmetic operations lawful. The blind are truly leading the blind.

The second is professional convergence. Academic programs, regulatory agencies, journals, and consultants all reproduce the same methodological vocabulary. Publications cite previous cost-effectiveness analyses as precedent; guidelines refer to NICE or, in Australia's case, earlier PBAC documents; international bodies cite each other. The field thus forms a self-referential network in which consensus replaces validation. A young analyst entering the system does not see a flawed framework; they see a unified professional front. The confidence mechanism is sustained by the belief that a method universally adopted must be correct. The HTA meme is self-sustaining.

The third is bureaucratic comfort. HTA's numerical apparatus provides bureaucracies with something they desperately need: the ability to make difficult resource-allocation decisions while avoiding the political and moral burden of uncertainty. The incremental cost-effectiveness ratio is not merely a number; it is an administrative shield. It converts ethical decisions into technical artefacts, enabling policymakers to present their choices as objective while operating entirely within a predetermined evaluative template. Its function is not to measure value but to neutralize uncertainty. The ratio need not reflect any underlying quantity, nor withstand scientific scrutiny, because its purpose is symbolic rather than empirical. What matters is not truth but the appearance of method. The ratio provides officials with a ready-made justification; an instrument that absorbs political risk by clothing arbitrary judgments in the language of economic analysis. In this way, the ICER does not need to be meaningful; it needs only to be *usable*. It reassures administrators, ministers, and committees that their decisions have been rendered through a formalized process, even when that process rests on non-measures and mathematically impossible constructions. The comfort derives not from validity but from ritual: the performance of calculation becomes a proxy for evidence, and the presence of a number substitutes for the presence of knowledge.

The fourth is fear of epistemic collapse. Many HTA professionals intuitively sense that if utilities are not measures, then the QALY collapses; if the QALY collapses, then cost-effectiveness collapses; and if cost-effectiveness collapses, then the entire structure of modern reimbursement policy collapses. For those deeply embedded within the system, whether in PBAC, NICE, or ICER, questioning the foundations threatens not only methodological identity but institutional viability.

This creates a powerful psychological pressure to avoid destabilizing questions. The confidence mechanism persists because the alternative is unthinkable.

In such an environment, belief becomes a survival strategy. The trick is not imposed; it is co-produced by the very people who depend on the system's continuity. The reference case becomes a cognitive refuge, an administrative necessity, and a scientific blind spot all at once.

THE AUSTRALIAN ORIGIN OF THE GLOBAL HTA VIRUS

The modern architecture of health technology assessment did not arise from scientific discovery but from Australia's administrative decision in the early 1990s to formalize economic evaluation through the PBAC guidelines. Provisional documentation, consolidated in 1995, marked the moment at which a national health system encoded cost-utility analysis, utilities, QALYs, and model-based incremental ratios as mandatory gatekeeping tools for pharmaceutical reimbursement⁷. Yet the most consequential aspect of these guidelines was not their content but their *replicability*. They became the initiating strain of a methodological virus; an informational construct that spread across jurisdictions, colonizing HTA systems in the UK, Europe, North America, and beyond. In Dawkins' terms, the QALY-based HTA framework spread not because it was true but because it was fit for transmission⁸.

The Australian environment in which the virus emerged was fertile. Confronted with escalating drug budgets and political demands for value for money, policymakers sought a single numerical currency that would allow comparisons across diseases and interventions. The QALY appeared to provide this, combining quality and length of life into a solitary metric. But the metric was never a measure. Utilities derived from time trade-off, standard gamble, or multi-attribute systems are ordinal scores; they rank states but do not quantify differences. Ordinal data cannot support addition, subtraction, or multiplication. Yet the PBAC guidelines treated these scores as interval-level quantities, multiplied them by time, aggregated them across populations, and embedded the resulting constructs within simulation models.

The critical point is that this foundational error did not weaken the guidelines; it made them virulent. A virus thrives when its structure is simple, portable, and capable of installing itself in new hosts without triggering defenses. The PBAC framework met all these conditions. It offered policymakers a veneer of scientific precision, analysts a procedural template, and governments a way to depoliticize rationing. The appearance of quantification acted as a cloak: no one asked whether the numbers were measures, because the system delivered what bureaucracy needed: a mechanism for allocation disguised as science.

This is how the PBAC guidelines became the progenitor of a global HTA virus. When NICE was established in 1999, British policymakers looked to Australia for precedent. The methodological frame, utilities, QALYs, discounting, modelling, incremental ratios, was adopted and further codified into a reference case. In memetic terms, NICE amplified the viral strain: it expanded its host range, strengthened its reproductive capacity, and embedded it more deeply in the professional culture of health economics. Once NICE adopted the QALY as its canonical measure, other jurisdictions, Canada, the Netherlands, Scandinavia, and eventually the United States treated the method as validated by global practice. The method spread through imitation, not evidence.

Like a virus adapting to its environment, the QALY-based framework evolved features that increased its survival. Academic programs began teaching its vocabulary; journals demanded its grammar; consultants created business models around its reproduction. Each replication event made the system more resistant to foundational critique. The very impossibility of the QALY, its reliance on non-measures, became invisible to those working within the paradigm. In Dawkins' terms, the meme secured its hosts by shaping their cognitive environment: analysts learned to manipulate utilities and models while remaining unaware of the axioms of representational measurement that would expose the illusion.

The success of this viral spread can therefore be attributed to a structural vulnerability in health policy. Governments need numbers. They need them to justify budgets, defend decisions, and appear rational. The QALY satisfies this administrative hunger. Its scientific impossibility is irrelevant; what matters is its ability to convert ethical dilemmas into technical ratios. This gave the method a powerful selective advantage. It proliferated because it performed a bureaucratic function; not because it measured anything.

As the virus spread globally, it reshaped expectations. HTA agencies everywhere adopted cost-per-QALY modelling as the definition of modernity. The framework conferred legitimacy through its very repetition: if Australia and the UK both used the method, then other countries could adopt it without scrutiny. This circular reinforcement forms the memetic core of the HTA virus: each agency becomes both a host and a transmitter, amplifying the illusion of scientific credibility simply by participating in it.

The result is a global HTA ecosystem built on an unmeasurable foundation. Utilities remain ordinal; QALYs remain non-quantities; models remain artefacts. Yet because the virus has colonized institutions, curricula, and professional norms, the system continues to replicate itself. It is not self-correcting; it is self-reinforcing. To rebuild HTA as a science rather than a viral doctrine, we must recognize Australia as the host in which the original strain emerged and PBAC's 1990s guidelines as the mechanism that launched it. Only by confronting the viral nature of the QALY paradigm can we begin the process of intellectual immunization; through measurement theory, Rasch modelling for latent constructs, and falsifiable value-claim protocols.

SELF PRESERVATION OF THE CONFIDENCE TRICK VIRUS

Understanding why the confidence mechanism persists in NICE, the PBAC and other agencies requires acknowledging that the system is exquisitely tuned to protect itself. Resistance is not irrational; it is structurally rational from the standpoint of institutional self-preservation. Four reinforcing dynamics explain its endurance.

The first is bureaucratic necessity. PBAC, like NICE and ICER, must make decisions. The absence of a scientifically valid metric for health does not remove the demands of budget allocation. The QALY persists because it allows the system to function. It is the administrative equivalent of epicycles in Ptolemaic astronomy; devices that preserve the model by absorbing contradictions.

The second is educational insulation. Graduate programs have never taught measurement theory, Rasch modelling, or the axioms of representational scales. They teach modelling, not

measurement. Analysts learn to manipulate numbers without learning what numbers are. This intellectual gap is the lifeblood of the confidence trick. Without measurement literacy, the false premise remains invisible. It is not that analysts are indoctrinated; they are unarmed.

The third is institutional credentialism. Professional authority in HTA is conferred by mastery of the reference case. The vocabulary of utilities, QALYs, discounting, and probabilistic sensitivity analyses operates as a guild language. To speak the language is to belong to the profession. To question the language is to risk professional isolation. This is why even senior economists rarely challenge the framework; the system rewards conformity, not critique.

The fourth is the absence of a visible alternative; until now. For years, critics could point out theoretical inconsistencies but could not present a coherent replacement. This permitted agencies to dismiss critique as philosophical rather than practical. The emergence of a measurement-based alternative, manifest ratio scales, Rasch-derived measures for latent constructs, and protocol-driven value claims, changes the calculus. It reveals that the “necessity” of the QALY was always an illusion created by the absence of imagination and education.

PBAC’s confidence trick persists because it is functional, familiar, professionally rewarding, and institutionally stabilizing. But it persists only until its epistemic foundations are exposed publicly and alternatives become widely understood.

CONSEQUENCES OF THE CONFIDENCE TRICK: SCIENCE, POLICY, AND PATIENTS

A system built on non-measurement and sustained by bureaucratic consensus does not remain confined to technical domains. Its effects radiate outward, shaping access to therapy, pricing structures, resource allocation, and the expectations of policymakers. The consequences of the HTA confidence mechanism are not abstract; they are material, financial, and clinical.

The first consequence is scientific stagnation. When an HTA framework relies on ordinal preferences masquerading as measurements, it becomes impossible for empirical science to enter the evaluative process: the evolution of objective knowledge ⁹. The QALY does not permit falsification; a simulation model does not allow replication; an incremental cost-effectiveness ratio cannot be verified against real outcomes. HTA thus becomes a closed discourse. It produces the surface appearance of quantitative sophistication while excluding the logic of scientific inquiry. Entire fields of psychometrics, item response theory, Rasch modelling, and representational measurement theory remain external to HTA’s intellectual universe because their inclusion would expose the foundational impossibility of current practice.

The second consequence is policy distortion. Decisions that appear precise are, in fact, arbitrary. Because utilities are ordinal, differences between them have no quantitative meaning. Because QALYs cannot exist as quantities, the threshold values used by PBAC, NICE, and ICER have no relationship to marginal benefit or opportunity cost. Because simulation models inherit the impossibility of their inputs, their projections cannot correspond to real-world outcomes. Yet governments rely on these outputs to justify expenditures of billions of dollars. A decision that

appears rigorously modelled is often little more than a numerical artefact cloaked in procedural legitimacy.

The third consequence affects patient access. When non-measures determine reimbursement, patients may be excluded from therapies based on imaginary arithmetic. A treatment may be rejected because its cost per QALY exceeds an arbitrary threshold, even though the QALY itself lacks empirical meaning. Conversely, a therapy may be funded because its model-based ratio appears favorable, even when real-world data might later reveal limited benefit. Patients are therefore subject to the outcomes of an epistemic illusion. The confidence trick is not harmless; it shapes who receives treatment, when, and on what terms.

The fourth consequence is legal vulnerability. As awareness grows of the measurement impossibility in utilities and QALYs, agencies may face legal challenges. A manufacturer denied listing or a patient group harmed by restricted access could argue that decisions were based on constructs that do not meet scientific standards. Such challenges have not yet occurred, but they are inevitable as knowledge spreads. A system founded on non-measurement cannot indefinitely evade scrutiny.

HOW A MEASUREMENT-BASED HTA DISSOLVES THE ILLUSION

The confidence trick collapses the moment measurement enters the conversation. When analysts, policymakers, and reviewers learn that utilities cannot be interval measures, that QALYs cannot exist as quantities, and that simulation models cannot generate evidence, the edifice loses its epistemic authority. What replaces it is not chaos but clarity.

A measurement-based HTA begins with the distinction between manifest and latent constructs. Manifest attributes, days in hospital, therapy switching, resource utilization, can be expressed as ratio scales and therefore support arithmetic. Latent constructs, symptoms, well-being, need fulfilment, require Rasch modelling to transform ordinal responses into invariant interval measures. This dual framework satisfies the axioms of representational measurement and allows value claims to be expressed as quantities capable of falsification.

The second element is the protocol-driven value claim. Every claim must specify the target population, measurement instrument, timeframe, analytic plan, and criteria for replication. Claims become testable propositions, not model outputs. Replication replaces simulation; evidence replaces projection.

The third element is institutional restructuring. NICE and the PBAC (and HTA agencies globally) must abandon the reference case and adopt measurement-based submissions. Agencies evaluate claims, not models. This returns HTA to the principles of the scientific revolution: measurement precedes arithmetic; evidence precedes authority; replication precedes inference.

Finally, the illusion dissolves through education. Your distance-education program provides the intellectual framework, representational measurement theory, Rasch, manifest/latent distinctions, and protocol construction, that equips analysts to see through the trick. Once they see that the

emperor has no clothes, they cannot unsee it. The system changes not by persuasion but by enlightenment.

CONCLUSION: FROM CONFIDENCE TRICK TO SCIENCE

HTA, as practiced through the reference case, is a bureaucratic confidence trick. It produces numbers that look like measures, models that look like predictions, and ratios that look like scientific evidence. But beneath this surface lies a void. Utilities are not quantities. QALYs cannot exist. Models cannot validate themselves. Agencies have institutionalized a method that gives governments a number for resource allocation while masking the absence of measurement.

This is not a conspiracy; it is a structural illusion. It is sustained by bureaucratic necessity, educational omissions, professional incentives, and mutual reinforcement among international agencies. But like the scholastic frameworks of earlier centuries, it is vulnerable to the single force it has successfully excluded: measurement.

Once measurement re-enters HTA, through the manifest/latent distinction, Rasch modelling, and protocol-based claims, the illusion collapses. A scientific HTA is possible. Australia is well positioned to lead the transition if it accepts the need for reconstruction rather than refinement.

The confidence trick has lasted fifty years. Hopefully, it will not last another fifty.

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A NEW START IN MEASUREMENT FOR HEALTH TECHNOLOGY ASSESSMENT

For readers who are looking for an introduction to measurement that meets the required standards, Maimon Research has just released two distance education programs. These are:

- Program 1: Numerical Storytelling – Systematic Measurement Failure in HTA.
- Program 2: A New Start in Measurement for HTA, with recommendations for protocol-supported claims for specific objective measures as well as latent constructs and manifested traits.

Each program consists of five modules (approx. 5,500 words each), with extensive questions and answers. Each program is priced at US\$65.00. Invitations to participate in these programs will be distributed in the first instance to 8,700 HTA professionals in 40 countries.

More detail on program content and access, including registration and on-line payment, is provided with this link: <https://maimonresearch.com/distance-education-programs/>

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