GOT-V1-1-3

The Life Attribution Procedure

Diagnostic Sequence, Classification Form, and Exemplar Desktop Studies

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1. Why Life attribution needs procedure

1.1. From definition and attribution to procedure

Paper 1 defined the life threshold: driven thermodynamic constraint-maintenance supported by Information Processing Locus-mediated Non-Trivial Computation. Paper 2 defined the attribution layer: the identification of the informational regime, Attribution Locus, DTS-completion relation, continuity status, class, topology, and residual to which that threshold belongs.

Those two moves establish the canon. They do not, by themselves, provide a repeatable way to move through contested cases. A candidate may be bounded but not alive, inactive but alive, host-completed without being active Life in its free phase, dead as one target locus while containing lower-order living subloci, or biologically consequential without preserving identity-bearing potential throughput.

The Life Attribution Procedure is the diagnostic expression of that canon. It is not an additional life theory and does not redefine life or attribution. Its role is to preserve the order of dependence when familiar objects, biological names, material boundaries, activity levels, dependence relations, lineage histories, and incomplete evidence all pull the audit toward premature verdicts.

The procedure does not make difficult cases easy. It makes their difficulty localisable.

1.2. Why direct classification fails

Life attribution often begins with a familiar noun: virus, seed, spore, cell, tumour, organ, organelle, parasite, symbiont, corpse, embryo, gamete, prion, tissue, colony, or organism. Such nouns are useful candidate selectors. They may indicate morphology, lineage, role, boundary, experimental convention, clinical relevance, or taxonomic habit.

They do not perform attribution.

A familiar noun cannot decide whether the relevant candidate is Life, Life-in-Potential, Complex Chemistry, a closed target locus, reconstruction material, incorporated material, or a case whose primary-class field must be withheld. The name can open the inquiry. It cannot close it.

The same is true of visible boundaries, activity, dependence, replication, lineage, biological material, and topology. Each may supply evidence. None is a verdict before the attribution relation has been located.

1.3. The procedural order

The procedure therefore moves in a fixed order: reference conditions before classification; candidate frame before verdict; life-realisation threshold before primary class; Attribution Locus before DTS-completion localisation; DTS completion before dependence is interpreted and before continuity is assigned; continuity before the ladder is assigned; primary class before topology; residual and update condition wherever a discriminator condition remains incomplete.

This order blocks the main collapse modes. Container collapse mistakes a visible enclosure for the living locus. Activity collapse treats metabolism, motion, growth, or reproduction as necessary or sufficient for Life. Dependence collapse treats host, scaffold, gestational, artificial, or ecological dependence as automatic non-life or automatic unity. Lineage collapse treats descent or copying as present life-status. Residual collapse hides uncertainty inside a familiar category.

The procedure prevents these errors by forcing each attribution burden to appear in sequence. It begins with the relation under evaluation, not with the answer.

1.4. Output fields and residual

The procedure does not return one undifferentiated noun. It separates the output into fields. The primary-class field records Complex Chemistry, Life-in-Potential, Life, or residual deferral where class assignment would overstate support. The continuity-status field records active, dormant, terminal active, potential, closed, or uncertainty carried in residual where a continuity status cannot be assigned. The attributed-locus field states whose informational regime is being evaluated. The DTS-completion field states where the life-realising or potential completion relation is performed. The topology field records relations among already-attributed loci. The residual field records what remains incomplete and what would change the attribution.

Residual is not weakness. It is the disciplined place where incomplete discriminator conditions are recorded. A residual must be local: it should identify the missing condition and the update condition rather than converting uncertainty into explanation or forcing a non-canonical field value.

1.5. Procedural aim

The aim of the Life Attribution Procedure is to determine the strongest warranted attribution for a candidate under a specified reference frame.

Where the attribution relation is strong enough, the appropriate field is filled. Where a formerly living target locus has closed, death is recorded through closure output rather than through the primary-class field. Where later life-like production depends on reconstruction after identity-bearing continuity has failed, reconstruction is recorded as a cross-locus descriptor rather than same-locus resumption. Where material enters another living regime without preserving the prior identity, incorporation is recorded as a cross-locus descriptor rather than survival.

Where the answer is incomplete, no stronger field should be forced. The procedure should state the residual and the update condition.

A good life-attribution procedure does not force verdicts. It prevents uncertainty from hiding inside familiar biological nouns.

2. The Life attribution procedure

2.1. Overview of the sequence

The procedure moves from frame to relation, from relation to locus, from locus to DTS completion, from DTS completion to continuity, from continuity to class, and from class to topology and residual.

This order is necessary. If the candidate frame is wrong, later classification attaches to the wrong object. If the life-realisation threshold is not tested before class assignment, complex chemistry may be promoted too quickly or life inside a container may be mistaken for Life of the container. If the Attribution Locus is not localised, active life-realisation, intrinsic resumability, identity-bearing potential throughput, target-locus closure, reconstruction, incorporation, non-identity-bearing chemistry, and residual deferral cannot be kept apart. If DTS completion is not localised, dependence becomes a shortcut. If continuity is not determined before class, dormant Life collapses into Life-in-Potential or death, and Life-in-Potential inflates into any stored biological information. If topology is assigned before class, parasite, organelle, symbiont, scaffold, and component become premature verdicts.

The full procedure is therefore:

Stage 0 — Reference preflight.

Stage 1 — Candidate framing.

Stage 2 — Life-realisation threshold.

Stage 3 — Attribution locus localisation.

Stage 4 — DTS-completion localisation.

Stage 5 — Identity and continuity determination.

Stage 6 — Primary class assignment or residual deferral.

Stage 7 — Topology and relationship assignment.

Stage 8 — Residual and update statement.

This sequence is not a checklist of independent traits. Each stage constrains the next. Later verdicts are only as strong as the earlier reference discipline permits.

2.2. Stage 0 — reference preflight

The procedure begins before the candidate is classified.

Reference preflight states the conditions under which the attribution will be evaluated. Without this step, a life claim drifts between scales, boundaries, horizons, and candidate relations.

The preflight must identify the provisional candidate, the focal scale, the reference boundary, the operational horizon, the relevant interface, the driving conditions, the discrimination/noise regime, the comparator assumptions, and the continuity question being asked. These are not decorative details. They determine what the procedure is allowed to mean.

A seed may be Life at the scale of continuity-preserving suspension over a germination horizon, may have closed continuity at the scale of failed embryo viability, or may require residual if intrinsic resumability cannot be assessed. A viral particle may be Life-in-Potential relative to a

host-completion horizon and Complex Chemistry relative to a frame that ignores admissible completion. A perfused organ may contain living cells at cellular scale without becoming a living organism at organ scale. A corpse may have closed organismal target-locus continuity while requiring separate constituent attribution at cellular, microbial, viral, or chemical scale.

Reference preflight prevents these claims from being treated as contradictions.

They may be different attributions under different reference conditions.

2.3. Stage 1 — candidate framing

Candidate framing states what is being tested. The candidate may be a system, subsystem, organism, cell, particle, tissue, organ, organelle, process, developmental relation, host-candidate pair, scaffolded arrangement, post-death remnant, or coupled organisation. The frame may be selected from ordinary perception, instrumentation, taxonomy, clinical practice, experimental isolation, ecological relation, or theoretical interest.

The frame is provisional. It does not assert that the candidate is the living locus. It states the first object of inquiry. A good frame is strong enough to be evaluated and loose enough to be corrected.

Frame correction may take several forms. The frame may be retained when it matches the maintained regime. It may be narrowed when life-realisation occurs inside the proposed object but belongs to a smaller Attribution Locus. It may be expanded when the proposed object excludes operations required for completion. It may be split when one apparent object contains several loci with distinct continuity relations. It may be coupled when no component alone completes the regime but the organised relation does. It may be held with residual when the available boundary, scale, horizon, or comparator conditions are insufficient.

The frame is not the answer. It is the first controlled error the procedure allows itself to correct.

2.4. Stage 2 — Life-realisation threshold

Once the candidate has been framed, the procedure asks whether life-realisation occurs within the frame.

Life-realisation is not established by complexity, persistence, metabolism, reproduction, boundedness, lineage, genetic material, or biological familiarity alone. It requires the convergence of three relations.

First, there must be a driven constraint-bearing regime. The candidate must be maintained away from undifferentiated relaxation by matter, energy, chemical potential, environmental cycling, or other relevant driving, and it must preserve constraints that restrict accessible trajectories over the operational horizon.

Second, there must be operative distinction. Differences within the regime must become organisation-dependent determinants of downstream trajectory selection. The candidate must not merely be describable by an observer. Its own organisation must make outcome classes depend counterfactually on discriminable distinctions.

Third, the operative distinction must be maintenance-relevant. It must contribute to maintaining, redirecting, repairing, regulating, reproducing, developing, inhibiting, resuming, transforming, or completing the driven constraint-bearing regime.

These three relations form the life-realisation threshold.

A candidate that has only driven structure remains below Life. A candidate that has only externally describable information remains below Life. A candidate that has NTC-like switching or control but does not use distinction-conditioned organisation to maintain its own regime may be non-trivially computational without being alive. A candidate that preserves identity-bearing distinctions without present life-realisation may be Life-in-Potential rather than Life.

Stage 2 therefore identifies whether realised life-relevant throughput is present somewhere in the frame. It does not yet decide which locus carries it.

Failure of present life-realisation does not end the audit. It sends the case forward to locus, completion, continuity, potential-throughput, closure, and residual analysis before any primary class is assigned.

2.5. Stage 3 — attribution locus localisation

Stage 3 asks which locus bears the regime relation under evaluation.

This stage does not assign the primary class. It localises the bearer to which later continuity, class, topology, closure, or residual will attach.

The relation under evaluation may be active life-realisation, intrinsic resumability, identity-bearing potential throughput, target-locus closure, reconstruction material, incorporated material, non-identity-bearing chemistry, or residual-deferral status. Where a negative relation is warranted, it should be stated as positively excluded under the stated frame. Where the discriminator condition remains incomplete, it should be marked uncertain and carried in residual.

A broad candidate frame may contain life without itself being the living locus. A narrow frame may preserve a component or throughput carrier without carrying the maintained regime. A coupled frame may include several candidate loci whose relations remain distinct. A supported frame may include artificial or environmental structures that preserve life without becoming the living locus. A post-closure frame may contain remnants, lower-order living loci, potential-throughput candidates, incorporated material, reconstruction material, and Complex Chemistry.

Attribution locus localisation identifies the operational unit whose regime or continuity relation is being classified. This is not the same as identifying the IPL. IPL localises distinction-conditioned causal work. Attribution locus localisation identifies whose regime, throughput, closure, reconstruction relation, incorporation relation, or residual is being attributed.

The locus is not necessarily the largest container, the most familiar biological noun, the smallest component, or the object most visible to the investigator. A cell may be the Attribution Locus. A multicellular organism may be the Attribution Locus. A dormant seed may be the same Attribution Locus through preserved intrinsic resumability. A host-completed candidate may be an Attribution Locus for identity-bearing potential throughput without being an active living locus in its free phase. A formerly living target locus may have closed continuity. A tissue may contain living cellular loci without becoming an organismal locus. A symbiotic association may become a higher-order locus only where the coupled relation stabilises its own maintained regime.

This stage prevents life-relevant throughput, potential throughput, closure, or residual from being assigned to the wrong object. Life inside a frame is not the same as Life of the frame,

and failure of active Life in a frame is not yet Complex Chemistry until locus, completion, continuity, and residual have been assessed.

2.6. Stage 4 — DTS-completion localisation

After localising the attribution locus, the procedure asks where the driven thermodynamic system is actually performed, intrinsically resumable, extrinsically completable, or insufficiently established for the regime relation under evaluation. Where a formerly living target locus has closed, the relevant completion output is no further same-locus DTS completion, not a new completion type.

This stage is needed because dependence is too coarse. Every living system depends. The relevant question is what kind of dependence is present and whether the candidate remains the locus whose identity-bearing organisation performs, resumes, or carries the relevant regime.

Where the environment supplies resources or permissive conditions and the candidate's own organisation performs the constitutive maintenance operations, completion remains attributable to the candidate. This is resource dependence.

Where external support supplies stabilising functions while the candidate remains the locus whose identity-bearing organisation is maintained, the relation may be scaffolded support. A ventilated organism, supported embryo, technically maintained tissue, or preserved cell population may require careful analysis, but artificial involvement alone does not decide the status.

Where another organised locus performs operations required to complete the candidate's regime, the relation is constitutive dependence. This may support Life with a dependence modifier, Life-in-Potential, coupled completion, or residual deferral with the primary-class field withheld, depending on locus attribution and continuity. It should not be treated as automatic non-life or automatic unity.

Where no component alone completes the regime but the organised interaction does, the procedure must consider coupled completion or higher-order locus attribution. Higher-order attribution is warranted only where the coupled relation stabilises its own maintained informational regime beyond the participating loci.

DTS-completion localisation therefore asks: Is the candidate completing its own life-realising regime, being supported while remaining the locus, requiring another locus for constitutive completion, participating in a coupled regime, preserving throughput for host or extrinsic completion, or merely being preserved as material?

The answer determines whether dependence modifies Life, prevents active Life, grounds Life-in-Potential, or leaves a discriminator condition for residual.

2.7. Stage 5 — identity and continuity determination

Classification cannot be assigned until continuity has been determined.

The central question is whether identity-bearing informational throughput remains attributable to the candidate locus.

If distinction-conditioned organisation is presently maintaining, redirecting, or completing the driven regime, the continuity status is active.

If active throughput is reduced or suspended but the same Attribution Locus preserves intrinsic resumability, the continuity status is dormant. Dormancy is Life under continuity-preserving suspension, not an exception to the life discriminator, not Life-in-Potential, and not death.

If the candidate remains in a terminal lifecycle phase where its own distinction-conditioned organisation is still completing the regime, the continuity status is terminal active until branch closure. Reproductive output, offspring, copies, or lineage continuation may occur during the terminal phase, but they do not preserve the original target locus after its own future branch-realisation has closed.

If the candidate is not presently life-realised and does not intrinsically resume as a living DTS, but preserves identity-bearing distinctions into a specified admissible extrinsic completion relation in which those distinctions would become counterfactually operative, the continuity status is potential.

If future counterfactual branch-realisation for a formerly living target locus as that locus has closed, the continuity status is closed. This is death of the target locus. Closed continuity is available only for a formerly living target locus; it is not a label for every constituent remaining inside the former system.

Reconstruction and incorporation are not continuity statuses in the same sense as active, dormant, terminal active, potential, or closed. They are cross-locus descriptors used where identity-bearing continuity has failed or where material enters another regime without survival of the prior locus.

Where any of these distinctions cannot be established, no continuity status should be forced. The missing condition belongs in residual with an update condition.

2.8. Stage 6 — primary class assignment or residual deferral

Only after framing, life-realisation, locus localisation, completion localisation, and continuity determination does the procedure assign the primary class.

The primary ladder has three classes.

Complex Chemistry applies where the candidate may be complex, organised, reactive, biologically derived, informationally describable, useful to life, or historically related to life, but does not establish active life-realisation, intrinsic resumability, or identity-bearing potential throughput.

Life-in-Potential applies where the candidate is not presently life-realised as a living locus but preserves identity-bearing potential informational throughput into admissible extrinsic life-realising completion. Life-in-Potential must not be shortened to “potential life.” It is a formal primary class for identity-bearing potential informational throughput into admissible extrinsic life-realising completion.

Life applies where the candidate is a correctly attributed Attribution Locus whose driven constraint-bearing regime is actively realised or intrinsically resumable through its own identity-bearing organisation.

Death is not assigned as a fourth primary class. It is recorded through closure output as closed continuity of a formerly living target locus. After target-locus closure, remaining constituents must be reframed and may receive their own class assignment where the discriminator conditions warrant it.

Reconstruction and incorporation are not primary classes. They are cross-locus descriptors used after identity-bearing continuity has failed or after material enters another regime without survival of the prior locus.

Where primary-class assignment would overstate support, the primary-class field is withheld and the missing discriminator condition is carried as residual deferral with an update condition. Unresolved is not a primary-class value.

The ladder therefore classifies regime status, not biological familiarity, topology, dependence, history, remnant condition, or uncertainty.

2.9. Stage 7 — topology and relationship assignment

After the primary class and continuity status have been assigned, the procedure may classify relationship topology. This ordering is essential. Relationship terms do not decide primary life-status. They describe how attributed loci relate.

A candidate may be condensed, nested, scaffolded, constitutively dependent, host-completed, coupled, higher-order, fragmented, parasitic, mutualistic, functional, incorporated-material, or reconstruction-material in its relation to other loci. These terms modify the attribution; they do not replace it.

A parasite may be Life. A free viral candidate may be Life-in-Potential and host-completed. An organ may contain living cells without being a living organism at organ scale. A mitochondrion may be a functional sublocus or constitutively dependent maintained organisation with residual carried at the mitochondrion-level life question. A closed organismal target locus may fragment into living subloci, potential candidates, Complex Chemistry, incorporated material, reconstruction material, and residual-bearing remnants.

Topology belongs after attribution because it relates already-localised regimes.

If topology is assigned too early, it becomes a disguised verdict. If topology cannot be assigned strongly enough, that uncertainty belongs in residual.

2.10. Stage 8 — residual and update statement

Every audit must end by stating residual.

Residual identifies what remains uncertain, which discriminator condition is incomplete, and what would change the attribution. It may concern the candidate frame, maintained boundary, operative distinction, comparator, DTS completion, continuity relation, throughput identity, scale, horizon, topology, evidence, intervention admissibility, or the difference between theoretical possibility and demonstrated completion.

Residual is not an explanation and not a field value inside the primary ladder, continuity-status list, or topology list. It is a disciplined remainder. A strong audit states not only what classification is currently warranted, but also why stronger classification is not yet warranted.

Where class assignment is warranted, classify. Where target-locus death is earned, use closure output and reframe constituents. Where closure is not earned or a field cannot be assigned without overstatement, carry the residual with an update condition.

2.11. Unresolved cases, residual, and update conditions

Unresolvedness is not a primary class, continuity status, topology modifier, or hidden verdict. It is the condition in which one or more discriminator requirements remain insufficiently established for the field that would otherwise be filled.

Residual is the procedural place where unresolvedness is recorded. It must be local. A residual should identify the specific missing condition: candidate frame, maintained boundary, operative distinction, comparator expectation, DTS completion, intrinsic resumability, throughput identity, branch closure, topology, scale, horizon, or admissibility of completion. A statement that the case is merely uncertain is not sufficient.

A case may carry residual in two different ways. First, a classification may be warranted but provisional because a non-decisive condition remains open. Second, primary-class assignment may be deferred because assigning Complex Chemistry, Life-in-Potential, or Life would overstate the available support. Primary-class deferral is therefore an audit result, not a fourth ladder value.

Closure output may also carry residual. Target-locus closure may be warranted while constituent status remains open. In that case, the closure output records death of the formerly living target locus, and residual records the need to reframe remaining constituents.

Every residual must include an update condition. The update condition states what observation, intervention, comparator result, continuity demonstration, or completion-path demonstration would change the attribution. This keeps the procedure corrigible without converting uncertainty into explanation.

2.12. Residual inventory

Residual should be inventoried by the discriminator condition it leaves incomplete. A residual statement should not merely say that the case is uncertain. It should identify which attribution field is uncertain, what condition is missing, and what update would change the audit.

The main residual types are as follows.

Candidate-frame residual occurs where the correct candidate frame, scale, boundary, or operational horizon remains unclear.

Reference-condition residual occurs where the boundary, interface, driving conditions, discrimination/noise regime, comparator assumptions, or continuity question are not specified strongly enough for the claim.

Threshold residual occurs where the convergence of driven constraint-bearing regime, operative distinction, and maintenance relevance remains incomplete.

Operative-distinction residual occurs where a possible distinction is present, but its organisation-dependent downstream role has not been localised strongly enough.

Comparator residual occurs where the relevant Baseline Dynamics family cannot yet be specified, constructed, or interpreted strongly enough to support the attribution.

Attribution-locus residual occurs where life-realisation, resumability, identity-bearing potential throughput, closure, reconstruction, incorporation, remnant status, or non-identity-bearing chemistry cannot yet be assigned to the correct bearer.

DTS-completion residual occurs where it remains uncertain whether completion is intrinsic, resource-dependent, scaffolded, constitutively dependent, host-completed, coupled, not

candidate-attributable, or not established strongly enough for the candidate relation. Where later realisation depends on external reconstruction after identity-bearing continuity has failed, the uncertainty should be carried as reconstruction or continuity residual rather than as a same-locus DTS-completion type.

Continuity residual occurs where active, dormant, terminal active, potential, or closed continuity cannot be assigned without overstatement.

Throughput-identity residual occurs where the candidate may preserve identity-bearing potential informational throughput, but the identity relation into admissible completion is not yet established strongly enough.

Closure residual occurs where target-locus branch-closure is possible but not yet warranted, or where closure of the target locus is warranted while constituent status remains unaudited.

Topology residual occurs where the relation among already-attributed loci remains uncertain: nested, scaffolded, constitutively dependent, coupled, higher-order, fragmented, parasitic, mutualistic, functional, incorporated-material, reconstruction-material, or other relation.

Constituent-audit residual occurs where a broad target locus has closed, but remaining cells, microbes, viral candidates, tissues, records, chemistry, incorporated material, or reconstruction material require renewed framing.

Where a field is uncertain, the recommended form is: [field]: uncertain — carried in residual / missing condition: [specific discriminator condition] / update condition: [observation, intervention, comparator result, continuity demonstration, or completion-path demonstration that would change the attribution].

This inventory prevents uncertainty from becoming a hidden class. It also prevents negative findings from being softened into vague uncertainty. A field may be uncertain, a relation may be positively excluded, or a classification may be warranted with residual. These are different outputs.

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3. Classification output form

3.1. Why an output form is needed

A diagnostic procedure should not end in a naked noun.

If the result is only “alive,” “not alive,” “dormant,” “viral,” “parasitic,” or “dead,” then the attribution has collapsed back into ordinary compression. The procedure must preserve the relation it has uncovered.

The output form records the attribution in a way that shows what was classified, at what level, with what continuity status, through what completion relation, and with what residual.

This does not mean every ordinary use must carry full notation. The form is for disciplined cases: edge cases, theoretical cases, experimental cases, disputed biological statuses, artificial-life cases, post-death constituent audits, and any case where familiar biological naming is insufficient.

3.2. Standard attribution output

The recommended standard attribution output is:

Primary class or residual deferral / continuity status / attributed locus / DTS-completion relation / topology or relationship modifier / residual.

Each element answers a different question.

The primary-class field answers whether the candidate is Complex Chemistry, Life-in-Potential, or Life. Where primary-class assignment would overstate support, the field is withheld through residual deferral rather than filled with a non-canonical value.

The continuity-status field answers whether the candidate's future branch relation is active, dormant, terminal active, potential, or closed. If no life-relevant continuity relation is warranted under the stated frame, the field may say so explicitly. If a continuity status cannot be assigned without overstatement, the field should be marked uncertain — carried in residual.

The attributed-locus field answers whose informational regime is being classified.

The DTS-completion relation answers where the life-realising, resumable, or potential completion relation is performed.

The topology or relationship modifier answers how the candidate relates to other loci after attribution has been made.

The residual answers what remains underdetermined and what would update the classification.

The primary-class field must not be filled with death, reconstruction, incorporation, topology, dependence, remnant status, or unresolvedness. Death is handled through closure output. Reconstruction and incorporation are cross-locus descriptors. Uncertain names the evidential condition of a field; it is not a verdict.

Where a relation is positively excluded under the stated reference conditions, say so explicitly. Do not use uncertainty language as negative confirmation. Where the field is uncertain, state the missing discriminator condition and the update condition in residual.

3.3. Closure output form

Closed target-locus cases use a separate closure output form rather than the standard primary-class form. This form is available only where a formerly living target locus no longer preserves future counterfactual branch-realisation as that locus. It should not be used for material that was never the target living locus, for non-identity-bearing remnants, or for constituents whose own attribution remains to be determined.

The recommended closure output is:

Closure output / closed continuity / formerly living target locus / no further same-locus DTS completion / remnant or fragmentation topology / residual and constituent-audit requirement.

The closure output is not a primary-class output. It records target-locus closure and prevents death from being treated as a fourth ladder class. It also triggers constituent reframing: remaining cells, microbes, viral candidates, chemistry, incorporated material, reconstruction material, and records must be evaluated through their own candidate frames where relevant.

3.4. Example forms

A dormant seed under viable germination conditions may be expressed as:

Life / dormant / seed-embryo Attribution Locus / resource-dependent intrinsic resumption / condensed or developmentally scaffolded topology / residual depends on viability evidence.

A free intact virion may be expressed as:

Life-in-Potential / potential / virion candidate / host-completed DTS pathway / DTS-incomplete free-phase topology / residual depends on demonstrated admissible completion and throughput identity.

A lysed infected host cell may require multiple outputs:

Closure output / closed continuity / formerly living host-cell locus / no further same-cell DTS completion / fragmented remnants / constituent audit required.

Life-in-Potential / potential / released viral candidates / host-completed DTS pathway / post-lysis potential-throughput topology / residual depends on infectivity and preserved identity-bearing organisation.

Complex Chemistry / continuity field not assigned: no life-relevant continuity relation warranted under the non-identity-bearing cellular-debris frame / non-identity-bearing cellular debris / no candidate-attributable DTS completion / decomposition or possible incorporated-material topology / residual minimal if no living subloci remain.

Where primary-class assignment is not warranted, the form should say:

Primary class: — / continuity field: uncertain — carried in residual where relevant / attributed locus: specified or uncertain / DTS-completion field: specified or uncertain / topology provisional where relevant / missing condition: [specific discriminator condition] / update condition: [what would change the attribution].

The point is not that these examples are final verdicts in every empirical case. The point is that one physical scene may contain several attribution outputs. A single frame may split. A target locus may close while its constituents require separate attribution.

3.5. Strength markers and false precision

The output may also include strength markers where needed.

A classification may be strong, provisional, or weak. Where discriminator conditions remain incomplete, the result is not an unresolved primary class; it is either a classification with residual or primary-class deferral with residual.

A strong attribution has a well-specified candidate frame, maintained boundary, scale, horizon, life-realisation or potential-throughput relation, completion relation, and continuity path.

A provisional attribution has enough structure to state the best current classification but leaves an important discriminator partially open.

A weak attribution identifies a plausible relation but lacks adequate evidence for one or more central conditions.

A primary-class deferral result does not yet support class assignment without premature closure and must state the missing discriminator condition and update condition.

Strength markers should never replace the residual statement. They only summarise it.

The output form must not create false precision. Some cases will not permit a complete form. Some will require multiple candidate frames. Some will branch by scale. Some will produce one output for the target locus and another for constituent material. Some will require multiple candidate outputs rather than a single classification.

The disciplined move is not to force the form. It is to make visible where the form breaks.

A classification is only as strong as the weakest relation it depends on. If the Attribution Locus is not established, then continuity and topology cannot be confidently assigned. If DTS completion is not established, then Life versus Life-in-Potential may remain open. If throughput identity is not established, then potential attribution must be weakened. If the operational horizon is poorly specified, death and dormancy may be overclaimed.

The output form is a record of discipline, not a rhetorical device.

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4. Audit template

4.1. Function of the audit template

The audit template standardises the application of the procedure.

Its purpose is not to make every case look the same. Its purpose is to ensure that each case is asked the same kinds of questions before classification is assigned.

Edge cases are especially vulnerable to selective attention. A virus audit may overfocus on metabolism. A seed audit may overfocus on inactivity. A tumour audit may overfocus on pathology. A mitochondrion audit may overfocus on lineage or organelle function. A corpse audit may overfocus on the death of the whole while ignoring constituent status.

The template prevents one salient feature from capturing the attribution.

It forces the analysis to move through the full relation.

4.2. Audit sequence

A full audit should proceed through the following sections.

1. Candidate frame.

State the candidate being evaluated and why that frame has been selected. Identify whether the candidate is an object, subsystem, relation, process, coupled arrangement, remnant, or postulated locus.

2. Reference conditions.

State the boundary, scale, operational horizon, interface, driving conditions, discrimination/noise regime, comparator assumptions, and continuity question.

3. Life-realisation threshold.

Assess whether a driven constraint-bearing regime is present, whether distinctions are operative through localisable organisation, and whether those distinctions maintain, redirect, resume, or complete the regime.

Every audit must state a comparator expectation: what would collapse, degrade, change, or remain invariant if the proposed distinction-conditioned organisation were ablated, scrambled, bypass-controlled, reset, neutralised, or otherwise disabled under comparable conditions.

4. Attribution locus localisation.

Determine whether the initially framed candidate is the attribution-bearing locus, contains an Attribution Locus, preserves intrinsic resumability, preserves potential throughput, has closed as a formerly living target locus, participates in a coupled locus, or fails locus attribution under current conditions. Where locus attribution fails or remains insufficient, record the residual rather than converting uncertainty into class.

5. DTS-completion relation.

Determine whether completion is intrinsic, resource-dependent, scaffolded, constitutively dependent, host-completed, coupled, or insufficiently established. Where later realisation depends on external reconstruction after identity-bearing continuity has failed, record reconstruction as a cross-locus descriptor rather than same-locus DTS completion. Where completion cannot be localised, the missing completion relation belongs in residual.

6. Identity and continuity.

Assess organisational identity, intrinsic resumability, continuity-preserving suspension, potential informational throughput, throughput identity, and branch closure. The formal continuity statuses are active, dormant, terminal active, potential, and closed. Reconstruction and incorporation are cross-locus descriptors. Unresolved continuity is a residual condition, not a continuity status.

7. Primary class.

Assign Complex Chemistry, Life-in-Potential, or Life where warranted. Primary class may only be Complex Chemistry, Life-in-Potential, or Life. Death must be recorded through closure output, not as primary class. Reconstruction and incorporation must be recorded as cross-locus descriptors, not as primary classes. Where class assignment is not warranted, withhold the primary-class field and carry residual deferral with an update condition.

8. Topology and relationship modifier.

Assign condensed, nested, scaffolded, constitutively dependent, host-completed, coupled, higher-order, fragmented, parasitic, mutualistic, functional sublocus, incorporated-material, or reconstruction-material relation where warranted. If topology is not established, state the residual; do not use unresolved as a topology value.

9. Residual and update condition.

State what remains unresolved and what would alter the classification.

This is the one place where a clear sequence is useful. The rest of the audit should be written as structured argument, not as a checklist.

4.3. Candidate frame

The candidate frame section must state what is being tested without smuggling in the conclusion.

A poor candidate frame begins with a verdict. It asks whether “the virus is alive,” “the organ is alive,” “the corpse is dead,” or “the mitochondrion is non-living” as if the noun already fixed the relation.

A disciplined candidate frame is more precise. It asks whether the free viral particle, the intracellular viral replication complex, the host-cell-plus-viral-cycle, the perfused organ, the organ's cellular populations, the formerly integrated organismal body, or the mitochondrial compartment is the candidate under evaluation.

The candidate frame should also state why the frame may require correction. A host cell may contain distinct regimes. A tumour may require scale separation. A corpse may require target-locus closure plus constituent audit. A developmental system may require a distinction between developing locus and completion environment.

The frame is allowed to change.

The audit should record when it does.

4.4. Reference conditions

The reference conditions section prevents scale drift.

A candidate may have different classifications at different scales or horizons. At one scale, a perfused organ contains living cells. At another, it may not be a living organism. At one horizon, a dormant spore preserves intrinsic resumability. At another, failed viability may close that branch. At one boundary, a viral particle is free and DTS-incomplete. At another, the viral cycle is host-completed. At one frame, a corpse may have closed organismal target-locus continuity while requiring separate constituent attribution at cellular, microbial, viral, or chemical scale.

The audit must therefore state the level at which the claim is made.

Reference conditions do not make the classification arbitrary. They make it evaluable.

4.5. Life-realisation threshold

The life-realisation section should be argued rather than ticked.

The auditor should ask whether the candidate contains or constitutes a driven constraint-bearing regime and whether the relevant distinctions are operative in maintaining that regime.

It is not enough to identify a boundary, a genome, a metabolism-like process, a copying relation, or a structure that can be interpreted.

The audit should distinguish active realised throughput from potential throughput. In active Life, distinction-conditioned organisation is presently maintenance-relevant. In Life-in-Potential, identity-bearing distinctions are preserved but require extrinsic completion before becoming life-realising. In Complex Chemistry, the candidate may be structured and consequential but lacks both realised maintenance and identity-bearing potential throughput.

This section must also state comparator expectations. What would have to collapse, degrade, change, or remain invariant if the proposed distinction-conditioned organisation were removed, scrambled, bypassed, reset, neutralised, or otherwise disabled under comparable boundary, scale, horizon, driving, component-inventory, and discrimination/noise conditions?

The comparator need not always be experimentally available. But the counterfactual dependence must be conceptually specified strongly enough for the attribution. Where comparator support is inferential rather than directly interventionist, the audit should state the strength marker and residual burden.

4.6. Attribution locus localisation

The attribution locus section asks whether the candidate frame has found the correct bearer.

A system may contain the relevant regime without being identical to it. A host may contain a parasite. A body may contain cells. A culture system may contain organisms. A cell may contain viral candidates. A corpse may contain living subloci or Life-in-Potential candidates after organismal target-locus closure.

The audit should name the locus to which the classification attaches. Where the answer is uncertain, that uncertainty should not be hidden under the broad frame.

The key distinction is simple:

Life present in the frame does not mean the frame is Life.

The Attribution Locus must be localised before primary class is assigned.

4.7. DTS-completion relation

The DTS-completion section identifies where the life-realising regime is actually performed.

This section is especially important for host-dependent, scaffolded, developmental, artificial, symbiotic, and potential candidates. It separates ordinary resource dependence from constitutive dependence. It also separates scaffolded support from replacement, coupled completion from containment, and Life-in-Potential from active Life.

A candidate that completes its own regime under supplied resources may be Life. A candidate that preserves intrinsic resumability under permissive conditions may be dormant Life. A candidate that requires another locus to make its retained distinctions operative may be Life-in-Potential. A candidate whose later realisation depends on external reconstruction after identity-bearing continuity has failed is not Life-in-Potential merely by being reconstructable.

The audit should therefore describe completion in causal and continuity terms.

Where completion is unknown, class assignment must be weakened and residual must state the missing completion relation.

4.8. Identity and continuity

The identity and continuity section determines what future branches remain attributable to the candidate.

The audit should distinguish organisational identity from throughput identity. Organisational identity belongs to maintained or resumable loci. Throughput identity belongs to non-life-realised candidates whose retained distinctions remain attributable into extrinsic completion.

A dormant organism preserves organisational identity through intrinsic resumability. A terminal organism preserves organisational identity until branch closure. A free viral candidate may preserve throughput identity into host completion. A dead remnant may preserve neither. A reconstructed organism may resemble a prior organism without preserving same-locus continuity. Incorporated material may support another organism without continuing as the prior locus.

The audit should state whether the candidate’s future branch-realisation is active, dormant, terminal active, potential, or closed. This is the point at which target-locus death can be

assigned as closed continuity. Death should not be used as a general label for every constituent after target-locus closure, and it should not be placed in the primary-class field.

For terminal active Life, the audit must keep the target locus separate from its reproductive output or descendants. Lineage continuation may follow from the terminal phase, but it does not keep the original target locus alive after branch closure.

Reconstruction and incorporation answer a different question: they record what happened after identity-bearing continuity failed or after material entered another regime. They should be treated as cross-locus descriptors, not as primary classes and not as same-locus survival.

4.9. Primary class

The primary class section gives the ladder output.

The auditor should assign Complex Chemistry, Life-in-Potential, or Life only after the preceding sections have supplied enough support.

Complex Chemistry is appropriate where the candidate lacks active life-realisation, intrinsic resumability, and identity-bearing potential throughput.

Life-in-Potential is appropriate where the candidate lacks present life-realisation but preserves identity-bearing potential informational throughput into admissible extrinsic completion. Life-in-Potential must not be shortened to “potential life.” It is a formal primary class for identity-bearing potential informational throughput into admissible extrinsic life-realising completion.

Life is appropriate where the candidate is the Attribution Locus of active or intrinsically resumable regime maintenance.

Death should be recorded through closure output, not as a fourth primary class.

Reconstruction and incorporation should be recorded as cross-locus descriptors, not as primary classes.

Where primary-class assignment would overstate support, the output should withhold the primary-class field and carry residual deferral with a stated update condition.

4.10. Topology and relationship modifier

The topology section records the candidate’s relation to other loci.

Topology should never be used as a shortcut for primary class. A candidate is not alive because it is parasitic, non-living because it is an organelle, or dead because it is contained in a corpse. Topology follows attribution.

The audit should classify the relation only as strongly as the evidence allows. A candidate may be nested, scaffolded, constitutively dependent, host-completed, coupled, higher-order, fragmented, parasitic, mutualistic, functional, incorporated-material, or reconstruction-material in relation to other loci.

This section is often where edge cases become clear. A free virion may be Life-in-Potential with host-completed topology. A parasite may be Life with nested parasitic topology. A perfused organ may contain living cellular loci while functioning as scaffolded tissue rather than organismal Life. A closed organismal target locus may have fragmented constituent topology.

Topology is not the verdict.

It is the relation of the verdict to other regimes.

If the topology cannot be assigned strongly enough, the missing topology condition belongs in residual.

4.11. Residual and update condition

The final audit section states what remains unresolved.

Residual should be local. It should not say merely “uncertain.” The term uncertain may be used to mark an output field only where it is immediately followed by the residual inventory item, the missing discriminator condition, and the update condition. A residual must identify what discriminator condition is incomplete.

The residual may concern whether the candidate preserves throughput identity, whether the maintained boundary is stable, whether DTS completion belongs to the candidate or another locus, whether intrinsic resumability is viable, whether the comparator is admissible, whether the operational horizon is long enough, whether topology is nested or merged, or whether evidence distinguishes reconstruction from continuity.

The update condition should state what would change the classification.

For example, a candidate may move from primary-class deferral to Life-in-Potential if identity-bearing throughput into admissible completion is demonstrated. It may move from Life with dormant continuity to closure output if intrinsic resumability is shown to have failed. It may move from functional sublocus with residual to Life if an independent maintained regime is demonstrated at the relevant scale. It may move from Complex Chemistry to Life if operative distinction is shown to maintain a driven constraint-bearing regime.

The residual keeps the audit corrigible.

Without it, procedure becomes another form of premature closure.

4.12. Compression of the audit template

The audit template can be compressed as follows:

Frame the candidate.

State the reference conditions.

Test life-realisation and state comparator expectation.

Localise the Attribution Locus.

Localise DTS completion.

Determine identity and continuity.

Assign the primary class where warranted or defer to residual.

Use closure output where target-locus death is warranted.

Assign topology and relationship modifiers where warranted.

State residual and update conditions wherever a discriminator condition remains incomplete.

This is the practical expression of the attribution canon.

It does not replace the canon.

It protects it in use.

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5. Exemplar desktop studies

5.0. How to read the exemplar desktop studies

The following cases are exemplar desktop studies. They are not exhaustive empirical reviews, field determinations, or final biological verdicts. They are structured applications of the attribution procedure to stylised candidate frames, intended to show how the framework handles contested cases without collapsing into familiar nouns, trait checklists, or premature closure. Each study states the attribution currently warranted by the candidate frame, reference conditions, life-realisation threshold, Attribution Locus, DTS-completion relation, identity and continuity relation, primary class, topology, and residual.

The compressed outputs in this section are conditional outputs under the stated candidate frame, scale, horizon, comparator assumptions, and reference conditions. They should not be read as general empirical determinations for all instances of the named biological category.[1]

The desktop studies should be read under the comparator discipline inherited from Paper 1. A strong life-realisation claim requires more than observed structure, activity, persistence, lineage, copying, or biological familiarity. It requires an expectation about what would collapse, degrade, change, or remain invariant if the proposed distinction-conditioned organisation were ablated, scrambled, bypass-controlled, reset, neutralised, or otherwise disabled under comparable boundary, scale, horizon, driving, component-inventory, and discrimination/noise conditions.

The desktop studies do not need to list every possible comparator intervention. But each classification depends on an implicit BD expectation: the relevant distinction-conditioned organisation must matter to maintenance, resumption, completion, or throughput identity in the claimed locus. Where that expectation cannot be specified strongly enough, the study must weaken the classification or carry residual.

5.1. Seed, spore, and cryopreserved bacterium

The first desktop study concerns dormant life.

The candidate frame is a seed, spore, cyst, or cryopreserved bacterium considered at the scale of the individual candidate locus over an operational horizon in which resumption is possible. The relevant question is not whether ordinary active throughput is currently visible. It is whether the same Attribution Locus preserves intrinsic resumability by which active life-realisation can resume under permissive conditions.

This is not an exception to the Paper 1 life discriminator. It is an attribution of Life across a horizon in which active throughput is reduced or suspended but the same Attribution Locus preserves intrinsic resumability required for active life-realisation to resume. The later environment may supply permissive conditions, but it does not reconstruct the candidate or complete it as another locus. Where intrinsic resumability has failed, dormancy is no longer warranted.

At the life-realisation threshold, the present candidate may show little activity. Metabolic throughput may be reduced, inhibited, slowed, or effectively suspended relative to ordinary active life. That reduction does not settle the attribution. The important relation is the preservation of identity-bearing organisation: boundary integrity where required, regulatory architecture, repair capacity where relevant, genetic and epigenetic continuity where relevant, metabolic restart path, and the internal organisation by which environmental permission becomes renewed life-realisation.

The Attribution Locus is the dormant candidate itself, not the surrounding environment that later supplies permissive conditions. Water, heat, oxygen, nutrients, pressure change, light, thawing, or other environmental conditions may be required. Those conditions do not by themselves perform the candidate's life-realising organisation. They permit the candidate's intrinsic resumability to become active resumption.

DTS completion is therefore resource-dependent or condition-dependent, but not extrinsically completed in the sense required for Life-in-Potential. The dormant candidate is not waiting for another locus to make its retained distinctions operative as part of that other locus's life-realising regime. It is waiting for conditions under which its own organisation can resume active maintenance.

The continuity status is dormant.

The primary class is Life.

The topology is usually condensed, though the exact topology depends on the case. A seed may include developmental structure and protective tissue; a bacterial spore may preserve compact intrinsic resumability; a cryopreserved bacterium may depend heavily on technical preservation. Those differences matter for the study, but they do not move the candidate into Life-in-Potential where intrinsic resumability is preserved.

The residual concerns viability. A particular seed may be dead. A particular spore may have lost intrinsic resumability. A particular cryopreserved bacterium may be damaged beyond resumption. In those cases, the class changes because intrinsic resumability has failed. Dormancy is therefore not assigned from inactivity alone. It is assigned where inactivity is paired with preserved intrinsic resumability.[2]

Compressed result:

Life / dormant / seed, spore, cyst, or cryopreserved-bacterium Attribution Locus / resource- or condition-dependent intrinsic resumption / condensed or technically preserved topology / residual depends on viability evidence.

5.2. Terminal salmon

The second desktop study concerns terminal active life.

The candidate frame is a salmon in its terminal reproductive phase, considered at organismal scale over the horizon in which migration, spawning, depletion, and death may occur. The ordinary temptation is to treat the organism as already dying in a way that weakens its life-status. That is a category error.

At the life-realisation threshold, the organism remains a driven constraint-bearing regime. It continues to regulate, move, orient, respond, mobilise reserves, maintain coordinated bodily function, and complete a lifecycle trajectory. Its distinction-conditioned organisation remains operative. It discriminates environmental cues, physiological states, spatial routes,

reproductive conditions, and bodily capacities in ways that alter downstream trajectory selection.[3]

The fact that long-term somatic continuation has been subordinated does not establish death. Life does not require indefinite maintenance of the present body. It requires distinction-conditioned maintenance, redirection, or completion of the relevant regime over the operational horizon. A terminal reproductive phase can be life-realising because the organism's organisation remains actively involved in completing the lifecycle branch.

The Attribution Locus is the salmon as organismal locus. Its reserves may be depleted. Its future branch-space may narrow. But branch-realisation has not yet closed. The organism is not merely passive matter undergoing decay. It remains an active locus completing a regime.

DTS completion remains intrinsic to the organism under resource depletion. Environmental conditions matter, but they do not replace the organism as the locus of life-realisation.

The continuity status is terminal active.

The primary class is Life until branch closure.

This attribution is not grounded in lineage survival. Reproductive success, gamete release, offspring production, or downstream lineage continuation may be involved in the terminal phase, but those later loci do not preserve the salmon as the same target organism. The salmon remains Life only while its own organismal regime is still distinction-conditioned, coordinated, and completing the terminal branch over the relevant horizon.

Death occurs only when future counterfactual branch-realisation for the salmon as that organism has closed. That may happen after spawning, exhaustion, predation, physiological collapse, or other terminal failure. Until then, terminality modifies the horizon; it does not remove Life.

Compressed result:

Life / terminal active / salmon organismal Attribution Locus / intrinsic regime completion under reserve depletion / terminal lifecycle topology / residual: closure only after branch-realisation fails.

5.3. Free intact virion

The third desktop study concerns Life-in-Potential.

The candidate frame is a free intact virion-like particle, considered outside a host cell at the scale of the particle and over a horizon that includes possible host entry and completion. The familiar dispute is whether the virion is alive or non-living. The procedure avoids that binary by asking what informational regime is present in the free phase.

At the life-realisation threshold, the free virion does not ordinarily maintain a living DTS. It does not perform active self-maintenance in the Paper 1 sense. It may be stable, structured, bounded by a capsid or envelope, and biologically derived. It may preserve sequence and molecular architecture. Those features do not establish Life.

However, the candidate may preserve identity-bearing potential informational throughput where its retained organisation carries distinctions into a specified admissible host-completed relation in which those distinctions would become counterfactually operative. The relevant organisation is not merely an externally readable sequence or biological material. Structure, sequence, packaging, entry relation, and host-specific completion must preserve throughput

identity so that later life-relevant operations remain attributable to the candidate's retained organisation rather than to external reconstruction.

The attribution locus in the free phase is therefore not an active living locus. It is a throughput-bearing candidate whose DTS completion is extrinsic and host-completed. The free virion's retained distinctions become life-relevant only when a host-cell regime supplies the completion conditions under which viral organisation is expressed, copied, assembled, propagated, or otherwise made operative.[4]

The continuity status is potential.

The primary class is Life-in-Potential, where throughput identity is established.

This classification is deliberately narrow. A broken virion, isolated sequence fragment, degraded capsid, or inert biological molecule is not Life-in-Potential merely by being related to a virus. The candidate must preserve identity-bearing organisation into an admissible completion pathway. If that organisation has failed, the status moves toward Complex Chemistry or residual deferral with the primary-class field withheld, depending on what remains established.

Compressed result:

Life-in-Potential / potential / free intact virion-like particle / host-completed DTS pathway / DTS-incomplete free-phase topology / residual depends on preserved throughput identity and admissible completion.

5.4. Productive viral infection and lysed cell

The fourth desktop study shows why one physical scene may require multiple outputs.

The candidate frame is a host cell undergoing productive viral infection, followed by lysis and release of viral candidates. A single broad frame contains several possible attribution targets: the host cell, the viral replication process, released viral candidates, cellular debris, and possibly other subcellular or molecular remnants. The study must not assign one status to everything inside the scene.

For the host cell, the life-realisation threshold may initially be satisfied. The cell is a living locus before infection overwhelms or redirects its regime. During infection, its organisation may be hijacked, redirected, degraded, or forced into trajectories that no longer preserve same-cell branch-realisation. At lysis, the host-cell maintained boundary and cellular integration fail. If no future counterfactual branch-realisation remains for that cell as that cell, the host-cell target locus has closed.

This is death of the host-cell locus, but it is not a fourth primary class. It is closed continuity for the formerly living host-cell target locus.

For the viral candidates, the attribution is different. Released virions are not dead merely because the host cell died. Their own status depends on whether they preserve identity-bearing potential throughput into admissible host-completed regimes. If they do, they are Life-in-Potential.

For the cellular debris, the attribution changes again. Non-identity-bearing cellular remnants that do not preserve intrinsic resumability, active cellular life-realisation, or potential throughput are Complex Chemistry. They may be chemically complex, biologically derived, and usable by other organisms, but they are not thereby Life-in-Potential.

The attribution field has therefore split. The host-cell locus closes. Viral candidates may retain potential throughput. Non-identity-bearing debris returns to Complex Chemistry or becomes incorporated elsewhere.

The BD expectation differs across the split outputs. Host-cell life-realisation would be expected to collapse, degrade, or close when the cell's maintained organisation and boundary fail. Viral potential throughput would be expected to collapse if the released particles lose the organisation required for admissible host completion. Debris classification would change only if a remaining constituent preserves its own life-realisation, intrinsic resumability, or identity-bearing potential throughput.

This study demonstrates the importance of post-death constituent reframing. Death of the target locus does not classify every constituent in the same way.

Compressed result:

Host-cell target locus: Closure output / closed continuity / formerly living host-cell locus / no further same-cell DTS completion / fragmented remnants / constituent audit required.

Released virions: Life-in-Potential / potential / released viral candidates / host-completed DTS pathway / post-lysis potential-throughput topology / residual depends on infectivity and preserved identity-bearing organisation.

Non-identity-bearing debris: Complex Chemistry / continuity field not assigned: no life-relevant continuity relation warranted under the non-identity-bearing cellular-debris frame / non-identity-bearing cellular debris / no candidate-attributable DTS completion / possible incorporated-material or decomposition topology / residual minimal if no living subloci remain.

5.5. Host-dependent intracellular parasite

The fifth desktop study concerns dependence without loss of life-status.

The candidate frame is an intracellular parasite considered as a possible Attribution Locus inside a host cell or host organism. The ordinary temptation is to treat deep dependence as evidence against life. The procedure rejects that shortcut.

At the life-realisation threshold, the parasite may maintain a driven constraint-bearing regime. It may preserve boundary, internal organisation, metabolic or regulatory processes, response capacities, reproductive or developmental phases, and distinction-conditioned trajectory selection. If those operations contribute to maintaining, redirecting, or completing its own regime, life-realisation is present for the parasite locus.

The Attribution Locus is distinct from the host where the parasite preserves its own identity-bearing organisation and branch-realisation. It may rely on host resources, host environment, host molecular machinery, or host-derived conditions. That dependence matters, but it does not erase locus distinction unless the parasite's continuity has been absorbed into a higher-order regime or reduced to mere component function.

DTS completion may be resource-dependent, scaffolded, constitutively dependent, or host-supported depending on the parasite. A strongly dependent parasite may need host context to complete phases of its lifecycle. That modifies completion relation and topology. It does not by itself deny Life.[5]

The continuity status is active where the parasite's own regime is presently realised. Where active phases require host context, that dependence should be recorded as host-dependent or lifecycle-stage-dependent DTS completion, not as a separate continuity status.

The primary class is Life if the parasite Attribution Locus satisfies life-realisation and continuity conditions.

The relationship modifier is parasitic, nested, and host-dependent where the evidence warrants it. The host relation may impose asymmetric cost. That cost helps identify parasitism, not primary life-status.

The BD expectation is that disrupting the parasite's own distinction-conditioned organisation, while preserving the relevant host context as far as possible, would collapse, degrade, or redirect parasite-regime maintenance or completion. If the apparent dependence is entirely host-driven and no parasite-level maintained regime can be localised, the attribution weakens toward functional sublocus, potential throughput, or residual deferral with the primary-class field withheld.

Compressed result:

Life / active / parasite Attribution Locus / host-dependent or lifecycle-stage-dependent DTS completion / nested parasitic topology / residual depends on degree of locus distinction and completion localisation.

5.6. Mitochondrion

The sixth desktop study is deliberately more difficult.

The candidate frame is a mitochondrion considered inside a eukaryotic cell at organelle scale. The familiar noun "organelle" is useful, but it cannot decide the attribution. The procedure must ask whether the mitochondrion is a nested living locus, a constitutively dependent maintained organisation, a functional sublocus of the cell-level DTS, or a residual-bearing candidate at mitochondrion scale.

At the life-realisation threshold, mitochondria are highly organised and dynamically maintained. They have membranes, electrochemical gradients, partial genetic systems in many cases, division dynamics, protein import, metabolic roles, and regulatory interaction with the cell. They participate deeply in cell-level energy transformation and signalling. These features show organisation and importance. They do not alone settle whether the mitochondrion carries its own life-realising informational regime.

The key question is whether distinction-conditioned organisation maintains a mitochondrion-level regime in a way attributable to the mitochondrion as Attribution Locus, or whether the relevant maintenance is inseparable from cell-level DTS completion. The mitochondrion's operations are constitutively dependent on the cell: nuclear-encoded proteins, cytosolic context, membrane trafficking, cellular regulation, and broader metabolic integration are often required for its maintenance and replication.[6]

This does not make the mitochondrion inert. It is not mere Complex Chemistry in ordinary functioning. It may be a maintained suborganisation with significant continuity. But calling it Life at the mitochondrion scale requires showing that its own maintained boundary, operative distinction, and continuity path satisfy life-realisation rather than functioning only as a cell-level sublocus.

DTS completion is therefore the central uncertainty. If completion is located primarily at the cell-level regime, the mitochondrion is best treated as a functional sublocus or constitutively dependent maintained organisation within Life. If a case could establish a mitochondrion-level life-realising regime with sufficient locus autonomy under defined conditions, a stronger nested-Life attribution might become available. In ordinary eukaryotic cellular context, the safer output is not a premature denial but a constrained attribution.

At cell scale, the relevant primary class is Life for the cell-level Attribution Locus. At mitochondrion scale, primary-class assignment should be deferred unless mitochondrion-level DTS completion and locus autonomy are established; the residual concerns whether the mitochondrion is only a functional or constitutively dependent sublocus, or whether a stronger nested-Life attribution is warranted.

Compressed result:

Cell-level output: Life / active / eukaryotic cell Attribution Locus / intrinsic cell-level DTS completion with mitochondrial functional subloci / nested functional topology / residual minimal for cell-level attribution.

Mitochondrion-scale candidate: Primary class: — / continuity field: uncertain — carried in residual / mitochondrion-scale candidate / DTS-completion field: uncertain between mitochondrion-attributable completion and constitutive cell-level completion / functional or constitutively dependent topology provisional / missing condition: mitochondrion-level maintained boundary, operative distinction, continuity, and DTS completion attributable to the mitochondrion / update condition: demonstration of mitochondrion-level life-realising maintenance sufficient for Life.

5.7. Tumour

The seventh desktop study concerns scale and divergent continuity.

The candidate frame is a tumour inside an organism. The ordinary temptation is to classify it by pathology alone: as disease, abnormal tissue, uncontrolled growth, or organismal dysfunction. Those descriptions may be clinically valid, but they do not complete life attribution.

At cellular scale, tumour cells are living cells where their driven constraint-bearing regimes remain active. They metabolise, respond, divide, repair, signal, and maintain cellular organisation. The primary class at cellular scale is Life.

At tissue or tumour scale, the attribution is more difficult. A tumour may show clonal continuity, boundary-like growth dynamics, vascular recruitment, immune evasion, microenvironmental interaction, and internally structured selection. These may support a tumour-level candidate frame. But tumour-level Life requires more than a population of living cells. It requires a maintained informational regime at tumour scale, with sufficient boundary, distinction-conditioned maintenance, continuity, and DTS completion attributable to the tumour as locus.[7]

The Attribution Locus may therefore be plural. The tumour contains living cellular loci. It may also be a divergent suborganismal population or pathological sublocus. Whether it qualifies as a higher-order Attribution Locus depends on the strength of tumour-level integration. Many cases will warrant living cellular population plus pathological topology rather than organismal-level life form.

DTS completion remains embedded in the host. The tumour depends on host tissue, vascular supply, immune context, and systemic resources. This dependence may be parasitic-like with respect to the host organism, but parasitic-like topology does not automatically make the tumour a distinct organism.

At cellular scale, the continuity status is active and the primary class is Life. At tumour scale, primary-class assignment should be deferred unless a tumour-level Attribution Locus, boundary, DTS completion, and higher-order continuity are established; otherwise the tumour-level claim carries residual.

Compressed result:

Cellular-scale output: Life / active / tumour-cell Attribution Loci / host-resource-dependent cellular DTS completion / divergent nested pathological topology / residual depends on cellular viability and comparator support.

Tumour-scale candidate: Primary class: — / continuity field: uncertain — carried in residual / attributed locus: tumour-scale candidate / DTS-completion field: uncertain / topology provisional / missing condition: tumour-level Attribution Locus, boundary, DTS completion, and higher-order continuity not established / update condition: demonstration of tumour-level regime maintenance beyond living cellular aggregation.

5.8. Perfused organ and organ-on-chip

The eighth desktop study concerns scale discipline.

The candidate frame is a perfused organ, preserved tissue, or organ-on-chip system. These systems may contain living cells, maintain tissue-level function, respond to stimuli, and preserve organised structure. The question is whether the organ or device-supported tissue is a living organismal locus.

At cellular scale, life-realisation may be present. Cells within the tissue may continue to maintain driven constraint-bearing regimes. They may metabolise, signal, repair, respond, and in some cases divide. At that scale, Life may be strongly attributed to cellular loci.

At organ scale, the attribution is different. An organ may preserve function, internal organisation, perfusion, and tissue viability. It may be maintained by artificial circulation, culture medium, mechanical support, or microfluidic systems. But organ-level function is not automatically organismal life. The organ may lack organism-level integration, self-directed whole-locus maintenance, reproductive or developmental continuity, and broader boundary regulation required for organismal attribution.[8]

The Attribution Locus may therefore be cellular or tissue-level rather than organismal. The organ may be a scaffolded tissue regime containing living subloci. The organ-on-chip may be an artefact-supported observation and maintenance platform rather than a living locus itself.

DTS completion is scaffolded or externally supported. The support apparatus may preserve conditions under which cells remain alive, but it does not necessarily become part of a higher-order living locus. If a future system were engineered in which the organ-device coupling stabilised its own maintained regime beyond the cells, higher-order attribution could be reconsidered. In ordinary cases, the procedure should not inflate viability into organismal Life.

Compressed result:

Living sublocus output: Life / active / viable cellular loci, and any tissue-level sublocus only where separately established / scaffolded or externally supported DTS completion / organ-scale scaffolded tissue topology / residual depends on viability and tissue-level integration.

Organ-scale candidate: Primary class: — / continuity field: uncertain — carried in residual / attributed locus: organ-scale candidate / DTS-completion field: uncertain / topology provisional / missing condition: organ-level organismal locus not established / update condition: demonstration that the organ-device coupling stabilises its own maintained regime beyond contained living subloci.

5.9. Artificial womb and developmental completion

The ninth desktop study concerns developmental support.

The candidate frame is a developing organism supported by a gestational or artificial womb-like system. The ordinary risk is container collapse: the support system is either treated as irrelevant environment or as if it absorbs the developing locus into itself. The procedure requires a more precise attribution.

At the life-realisation threshold, the developing candidate may preserve identity-bearing developmental organisation. Its distinctions are not merely stored. They participate in growth, differentiation, regulation, and changing organismal integration over time. The candidate's regime may be incomplete at present, but incompletion is not non-life where developmental continuity and life-realisation are actively unfolding.

The Attribution Locus is the developing organism where its own organisational continuity directs development through supplied conditions. The gestational or artificial system may be necessary, but necessity does not automatically make it the living locus. It may supply resources, waste exchange, temperature control, mechanical protection, hormonal context, oxygenation, or other completion conditions.[9]

DTS completion is coupled or scaffolded depending on the case. If the support supplies permissive or substitutive functions while the candidate's own developmental regime remains the continuity locus, the candidate remains Life. If the support system performs constitutive organisation in a way that makes the candidate's locus status unclear, residual must be stated. If a later organism is externally constructed after candidate continuity has failed, the relation becomes reconstruction rather than development.

The continuity status is active where identity-bearing organismal continuity is preserved. The primary class is Life for the developing organismal locus.

Compressed result:

Life / active / developing organismal locus / gestational or artificial scaffolded or coupled completion / developmental support topology / residual depends on degree of constitutive support and locus attribution.

5.10. Prion and viroid

The tenth desktop study stress-tests replication and templating. The candidate frame may be a prion-like conformational propagator or a viroid-like infectious RNA candidate. These cases should not be collapsed together. They are grouped here because both challenge the temptation to treat copying, infection, or biological consequence as sufficient for Life.

A prion-like candidate may propagate conformational state. It may alter downstream biological trajectories in a host. It may be copied in a broad sense through templated misfolding. But replication-like propagation is not life-realisation. The question is whether the candidate preserves identity-bearing potential throughput into an admissible life-realising completion pathway, or whether it remains a pathological molecular propagation process within another living regime.

If the prion-like candidate lacks a life-realising completion pathway attributable to its own informational regime, the safer classification is Complex Chemistry. If the relevant conditions remain incomplete, the primary-class field should be withheld and residual must be carried. It may be active biological cause without being Life-in-Potential.

A viroid-like candidate may be closer to Life-in-Potential if its retained RNA organisation can enter a host-completed pathway in which its distinctions become counterfactually operative in replication and propagation. Even here, Life-in-Potential is not automatic. The audit must establish throughput identity, admissible completion, and candidate-attributable downstream dependence. If those are not strong enough, the primary-class field should be withheld and residual must be carried.

The Attribution Locus in both cases is not active Life in the free phase. DTS completion, where present, is host-completed. The distinction between Complex Chemistry and Life-in-Potential depends on whether the candidate carries identity-bearing throughput into completion rather than merely causing or templating a biological effect.[10]

Compressed result:

Prion-like candidate, where candidate-attributable life-realising completion is positively excluded: Complex Chemistry / continuity field not assigned: no life-relevant continuity relation warranted under the stated frame / prion-like conformational propagator / no candidate-attributable life-realising DTS completion / pathological molecular propagation topology / residual depends on whether throughput identity and admissible completion can be demonstrated.

Prion-like candidate, where throughput identity or admissible completion remains uncertain: Primary class: — / continuity field: uncertain — carried in residual / attributed locus: prion-like conformational propagator / DTS-completion field: uncertain / pathological molecular propagation topology provisional / missing condition: throughput identity or admissible completion / update condition: demonstration that retained prion-level organisation carries identity-bearing throughput into admissible life-realising completion.

Viroid-like candidate, where throughput identity and admissible host-completion are established: Life-in-Potential / potential / viroid-like RNA candidate / host-completed DTS pathway / free-phase DTS-incomplete topology / residual depends on throughput identity and admissible completion.

5.11. Synthetic protocell or protocell-like chemistry

The eleventh desktop study concerns the chemistry-to-life band.

The candidate frame is a synthetic protocell, artificial vesicle, autocatalytic network, compartmentalised reaction system, or protocell-like chemical assembly. The ordinary temptation is to decide too quickly: either to call the system alive because it resembles early life, or to dismiss it as chemistry because it is artificial, minimal, or incomplete.[11]

The procedure does neither.

At the life-realisation threshold, the candidate must first establish a driven constraint-bearing regime. A vesicle, gradient, autocatalytic loop, membrane-like structure, or energy-driven reaction may satisfy part of this condition. But driven organisation is not enough.

The next question is operative distinction. Does the candidate contain distinctions that alter downstream trajectory selection through its own organisation? Are differences in internal state, boundary state, sequence, composition, catalytic arrangement, or environmental coupling made consequential in a way that is more than external description?

The final threshold question is regime maintenance. Do those operative distinctions contribute to maintaining, repairing, reproducing, stabilising, transforming, or completing the regime that carries them? If the answer is no, the candidate remains Complex Chemistry, however interesting. If the answer is partially supported but incomplete, the primary-class field should be withheld and residual must be carried. If the answer is strong, the candidate may cross into Life.

The Attribution Locus must also be established. A laboratory apparatus may drive the chemistry. A researcher may select conditions. A designed protocol may impose cycles. The question is whether the candidate's own informational regime maintains the relevant constraint structure, or whether the appearance of maintenance is externally imposed.

DTS completion may be intrinsic, scaffolded, or externally driven. This distinction is central. A synthetic protocell whose organisation maintains itself under supplied resources is different from a chemical system whose order is maintained only by external protocol.

Evidence-dependent output range:

The following outputs are alternatives under different evidence states. They should not be read as simultaneous classifications of one candidate frame.

Complex Chemistry / continuity field not assigned: active life-realisation, intrinsic resumability, and identity-bearing potential throughput positively excluded under the protocell-like chemistry frame / protocell-like chemistry candidate / externally driven or incomplete DTS completion / synthetic or protocell-like topology / residual minimal under this evidence state; update if candidate-attributable operative distinction, regime maintenance, Attribution Locus, and identity-bearing continuity are demonstrated.

Life / active / synthetic protocell Attribution Locus / intrinsic or resource-dependent DTS completion / protocell topology / residual depends on sustained identity-bearing continuity.

Primary class: — / continuity field: uncertain — carried in residual / attributed locus: synthetic protocell or protocell-like chemistry candidate / DTS-completion field: uncertain / topology provisional / missing condition: convergence of driven organisation, operative distinction, regime maintenance, Attribution Locus, and identity-bearing continuity not yet established / update condition: demonstration of candidate-attributable regime maintenance.

5.12. Corpse and post-death remains

The final desktop study concerns post-death attribution.

The candidate frame is a corpse or post-death body considered at organismal scale and then at constituent scales. The ordinary temptation is to assign one status to the whole scene. The procedure requires a split.

At organismal scale, the target locus is the formerly living organism. If all future counterfactual branch-realisation for that organism as that organism has closed, the organismal target locus

has closed continuity. This is death of the organismal locus, not a fourth primary class. The body may retain shape, tissue structure, DNA, organs, fluids, microbial communities, parasites, viral particles, and chemically complex remnants. None of that reopens organismal branch-realisation.

Death applies to the target locus.

It does not classify every constituent.

At cellular scale, some cells may remain alive for a limited horizon after organismal death, depending on conditions. At microbial scale, resident or invading organisms may be living loci. At viral scale, intact viral candidates may remain Life-in-Potential. At chemical scale, non-identity-bearing tissue breakdown products are Complex Chemistry. Some materials may later be incorporated into other living systems. Some records or sequences may support reconstruction without preserving same-locus continuity.[12]

The attribution field has fragmented. Organismal unity has closed, but constituents require renewed candidate framing.

DTS completion differs by constituent. Living microbes complete their own regimes. Remaining host cells, if viable, may temporarily maintain cellular regimes. Viral candidates may require host completion. Non-identity-bearing molecules have no life-relevant completion path of their own. Incorporated nutrients become part of another organism's regime, not a continuation of the corpse as locus.

The BD expectation also differs by constituent. Organismal life-realisation would not be restored by preserving body outline, DNA, or tissue structure if organismal branch-realisation is closed. Living cells or microbes would require their own maintained regimes and comparator expectations. Viral candidates would require preserved throughput identity into host completion. Non-identity-bearing chemistry remains below Life and Life-in-Potential.

Compressed result:

Closure output / closed continuity / formerly living organismal locus / no further organismal DTS completion / fragmented constituent field / residual and constituent-audit requirement: separate audits for cells, microbes, viral candidates, and chemistry.

5.13. Cross-audit compression

The exemplar desktop studies show that the procedure does not classify by one salient feature.

Dormancy shows that inactivity is not death and not Life-in-Potential where intrinsic resumability remains.

Terminal active life shows that narrowing future branch-space is not branch closure while distinction-conditioned organisation still completes the regime.

The free virion shows that absence of active DTS does not force Complex Chemistry where identity-bearing potential throughput remains.

The lysed infected cell shows that death of one target locus does not classify every constituent.

The parasite shows that dependence is not non-life.

The mitochondrion shows that functional integration and lineage do not settle locus status without DTS-completion analysis.

The tumour shows that cellular Life, tissue pathology, and possible higher-order locus attribution must be scale-separated.

The perfused organ shows that living subloci do not automatically make the containing organ an organismal living locus.

Artificial gestation shows that scaffolded or coupled completion need not erase the developing locus.

Prion and viroid cases show that copying, templating, infection, or biological consequence does not by itself establish Life or Life-in-Potential.

Synthetic protocell chemistry shows that the chemistry-to-life transition may be materially gradual but operationally narrow.

The corpse shows that death closes the target locus, while constituents require renewed framing.

The common result is the same in every case.

Life attribution must move from object to informational regime, from regime to Attribution Locus, from Attribution Locus to completion relation, from completion relation to continuity, from continuity to class, and from class to topology.

Where any step fails, residual must be carried rather than hidden.

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6. Cross-case findings

6.1. The desktop studies do not produce a biological checklist

The exemplar desktop studies do not converge on a biological checklist.

They do not show that life is always marked by metabolism, reproduction, membrane enclosure, autonomy, movement, growth, lineage, genetic material, ecological participation, or familiar organismal form. Those features may be important. In some cases, they are central. In other cases, they mislead.

A dormant seed may lack visible activity while remaining Life. A free virion may preserve identity-bearing throughput without active life-realisation. A terminal salmon may be approaching closure while remaining actively alive. A perfused organ may contain living cells without becoming a living organism at organ scale. A corpse may be dead as an organismal target locus while containing lower-order living loci, Life-in-Potential candidates, and Complex Chemistry.

The audits therefore do not identify one empirical sign that should replace all others.

They show that every sign must be placed inside an attribution relation.

The procedure’s result is not a trait-list. It is a disciplined movement from candidate frame to informational regime, from informational regime to Attribution Locus, from Attribution Locus to completion relation, from completion relation to continuity, from continuity to class, and from class to topology.

The value of the procedure lies in preserving that movement.

6.2. Container does not identify locus

The first cross-case finding is that containment is not attribution.

The visible container is often useful because it gives inquiry a starting point. A membrane, capsid, body, organ, cell wall, womb, culture vessel, host, corpse, or technical enclosure may define a provisional candidate. But it does not decide whether the enclosed matter is Life, Life-in-Potential, Complex Chemistry, a closed target locus, incorporated material, reconstruction material, or a residual-bearing candidate.

The same container may hold several attribution relations. A lysed infected cell may contain a closed host-cell target locus, released viral candidates, and non-identity-bearing chemistry. A corpse may contain closed organismal identity, temporarily living cells, microbes, potential viral candidates, and material that later becomes incorporated elsewhere. A host organism may contain parasites, symbionts, tumours, organs, cells, and non-living contents. A perfusion apparatus may contain living tissue without itself becoming a life form.

The Attribution Locus is therefore not the same as the containing frame.

The procedure must identify which informational regime is being preserved, resumed, completed, potentialised, or closed. If the visible boundary does not carry that regime, the frame must be narrowed, expanded, split, coupled, or recorded with residual where the needed discriminator condition is incomplete.

Containment is evidence for a possible boundary.

It is not evidence of identity by itself.

6.3. Dependence does not decide life-status

The second cross-case finding is that dependence is not a verdict.

All life is dependent. Living regimes require matter, energy, compatible boundary conditions, environmental regularity, and sufficient operational horizon. Many living regimes also require developmental environments, ecological partners, host conditions, symbiotic relations, parental care, artificial support, or technical scaffolds.

The question is not whether a candidate depends.

The question is what kind of dependence is present and where DTS completion occurs.

Resource dependence does not weaken Life where the candidate's own organisation performs the maintenance relation under supplied conditions. Dormant seeds, spores, cells, plants, animals, and microorganisms all depend on external conditions without losing attribution.

Scaffolded support does not automatically erase the candidate locus where support preserves conditions for the candidate's own regime. A ventilated organism, supported embryo, or technically maintained tissue may remain attributable to the biological locus if identity-bearing organisation remains the relevant continuity.

Constitutive dependence requires stronger analysis because another organised locus participates in completion. A free virion-like candidate, certain host-dependent life cycles, developmental relations, and tightly integrated symbioses cannot be classified by independence language. Their status depends on whether the candidate is active Life, Life-in-Potential, a functional sublocus, part of coupled completion, or a residual-bearing case requiring further discriminator support.

Dependence therefore modifies attribution.

It does not replace attribution.

6.4. Activity level does not decide death

The third finding is that activity level is not the death discriminator.

Visible activity can be reduced, suspended, slowed, redirected, or terminally narrowed without branch-closure. Dormancy shows this most clearly. A dormant seed, spore, cyst, or cryopreserved bacterium may not display ordinary active throughput, but if intrinsic resumability remains preserved, the candidate remains Life.

Terminal active life gives the complementary case. A terminal organism may no longer preserve long-term somatic continuation, yet still maintain a life-realising regime over the relevant horizon. A terminal salmon remains alive while its distinction-conditioned organisation completes migration, spawning, reserve mobilisation, and reproductive branch-realisation. Terminality narrows the horizon. It does not by itself close the branch.

Death is different.

Death is closure of future counterfactual branch-realisation for the target locus as that locus. It is not inactivity alone, not reduced metabolism alone, not loss of one function alone, and not the presence of biological remains.

The procedure therefore separates inactivity, dormancy, terminal activity, and death.

This separation prevents two opposite errors. It prevents dormant Life from being misclassified as dead or merely potential. It also prevents recognisable biological structure from being treated as alive after the target locus has closed.

6.5. Replication does not establish Life

The fourth finding is that replication, copying, templating, or propagation does not establish Life by itself.

Replication matters only when placed inside the attribution architecture. A living organism may reproduce. A cell may divide. A viral candidate may be copied through host completion. A prion-like molecule may template conformational change. A crystal may grow by repeated patterning. A chemical network may amplify components. A record may be copied. A digital file may replicate.

These are not equivalent.

The life question is whether distinction-conditioned organisation maintains, resumes, or completes a driven constraint-bearing regime attributable to the candidate locus. Replication may participate in that regime, but it does not substitute for it.

This finding is especially important for prion-like, viroid-like, viral, protocell, and synthetic cases. A copied distinction is not necessarily life-realising. A propagating pattern is not necessarily an Attribution Locus. A sequence that can be copied is not necessarily identity-bearing throughput. A molecule that alters a host is not necessarily Life-in-Potential.

The procedure therefore asks what replication is doing.

If replication participates in the candidate's realised maintenance, it may support Life. If it preserves identity-bearing throughput into extrinsic completion, it may support Life-in-Potential. If it is only externally imposed copying, pathological propagation, or useful reconstruction material, it does not by itself raise the candidate above Complex Chemistry.

6.6. Biological material does not establish Life-in-Potential

The fifth finding is that Life-in-Potential is narrow.

This classification is easily inflated. Biological material feels close to life because it may come from living systems, resemble living structures, store sequence, preserve morphology, trigger biological effects, or be usable by future living systems. But those facts are insufficient.

Life-in-Potential requires identity-bearing potential informational throughput.

A candidate qualifies only where it preserves distinctions in an organisation capable of entering an admissible life-realising completion pathway such that those distinctions become counterfactually operative in the later regime. It is not enough that an external system can read, copy, reconstruct, interpret, metabolise, or use the material.

A free intact virion-like candidate may qualify where throughput identity and host completion are preserved. A degraded virion may not. A viroid-like candidate may qualify where retained RNA organisation enters host-completed life-realising propagation. A prion-like candidate may fail if it establishes only molecular propagation without candidate-attributable life-realising completion. A dead genome may be reconstructable without preserving Life-in-Potential. A corpse may contain chemically useful material without preserving the former organism's identity-bearing throughput.

Life-in-Potential is therefore not a sentimental category for almost-life.

It is a strict attribution of potential throughput.

6.7. Closure output records target-locus death

The sixth finding is that death must be attributed to a target locus through closure output.

A formerly living target locus has closed when no future counterfactual branch-realisation remains for that locus as that locus. This closure is death of the target locus. It is not a fourth primary class and it is not a blanket status for every remaining constituent.

The formal expression is:

Closure output / closed continuity / formerly living target locus / no further same-locus DTS completion / remnant or fragmentation topology / residual and constituent-audit requirement.

A dead organism may leave a heterogeneous attribution field. Some microbial loci may continue independently. Some cellular subloci may remain alive over limited horizons. Some viral candidates may remain Life-in-Potential. Some non-identity-bearing cellular remnants may become Complex Chemistry. Some material may be incorporated into other organisms. Some records or sequences may support reconstruction without preserving same-locus continuity. Some relations may require residual rather than a forced field value.

This finding prevents corpse-level classification from becoming a blanket verdict.

The organismal target locus may have closed. Its constituents require separate attribution.

6.8. Topology follows attribution

The seventh finding is that relationship topology follows attribution.

Parasitism, symbiosis, organelle status, scaffolded support, host completion, functional sublocus, higher-order locus, fragmentation, reconstruction material, and incorporated material are not primary ladder classes. They are relation descriptors. They become meaningful only after the relevant loci have been identified.

A parasite may be Life. A free virion may be Life-in-Potential. A mitochondrion may be a constitutively dependent maintained suborganisation or functional sublocus with residual carried at the mitochondrion-level life question. A tumour may be cellular Life with divergent topology rather than an organism. A perfused organ may contain living subloci without being a living organism at organ scale. A closed organismal target locus may leave a fragmented constituent field after branch closure.

If topology is assigned too early, it becomes a shortcut. The word parasite can smuggle in life-status. The word organelle can smuggle in non-life. The word scaffold can hide completion. The word symbiosis can hide residual uncertainty about unity. The word corpse can hide constituent diversity.

The procedure prevents topology from deciding what it should only describe.

6.9. Residual is disciplined uncertainty management

The eighth finding is that residual is not failure.

Several audits do not force final classification. Mitochondria, tumours at higher-order scale, prion-like candidates, viroid-like candidates, synthetic protocells, artificial gestational systems, and deeply coupled symbioses may leave incomplete discriminator conditions. The missing condition may concern maintained boundary, DTS completion, throughput identity, scale, horizon, comparator construction, or topology.

A procedure that forced all such cases into Life, Life-in-Potential, or Complex Chemistry without residue would be less disciplined, not more.

Residual preserves the unfinished discriminator state.

It says what is not yet established and what would need to be shown for classification to strengthen or change. This keeps the procedure corrigible. It prevents uncertainty from becoming mystification, rhetorical closure, or false equivalence.

The correct output for a difficult case may be a classification plus residual.

It may also be primary-class deferral with residual where the discriminator conditions remain insufficient.

Residual is not a primary class, continuity status, or topology value.

6.10. The narrow band between chemistry and life

The final cross-case finding is that the chemistry-to-life transition may be materially gradual but operationally narrow.

There may be many intermediate structures: driven chemical systems, compartments, gradients, autocatalytic networks, templates, sequences, membranes, vesicles, protocell-like

systems, reaction cycles, host-dependent particles, and hybrid chemical-biological arrangements. These may form gradients of complexity and continuity.

But the attribution threshold remains narrow because only a specific convergence earns Life.

The candidate must support a driven constraint-bearing regime. Discriminable distinctions must become operative through localisable organisation. Those distinctions must maintain, redirect, resume, transform, or complete the regime. An Attribution Locus must be identifiable. DTS completion must be localised. Identity-bearing continuity must remain open.

Life-in-Potential occupies a different narrow band. It requires non-life-realised identity-bearing throughput into admissible extrinsic completion. It is not generic pre-life complexity.

Complex Chemistry remains broad. It includes structured, reactive, biologically derived, chemically important, and life-adjacent systems where realised or potential informational throughput is not established.

Where the evidence is incomplete, the procedure should not add a fourth ladder state. It should withhold the primary-class field and carry residual deferral until the missing discriminator condition is resolved.

The procedure therefore allows gradients without losing thresholds.

It does not deny continuity in nature.

It disciplines attribution within that continuity.

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7. Guardrails and failure modes

7.1. Function of guardrails

The procedure is vulnerable to misuse because it sits between concept and application.

If handled poorly, it may become the very thing it was designed to prevent: a checklist, a classificatory shortcut, a new life definition, or a rhetorical machine for forcing verdicts.

The guardrails in this section protect the procedure from that drift. They do not add criteria. They state what must not happen when the attribution canon is applied.

The core rule is simple:

Do not let familiar biological terms survive after their discriminator conditions have disappeared.

Where the term no longer carries Attribution Locus, informational regime, DTS completion, continuity, topology, and residual discipline, it must be weakened, corrected, or held as ordinary shorthand rather than disciplined classification.

7.2. Definition drift

Definition drift occurs when the procedure begins to redefine life.

The procedure must never replace Paper 1’s life discriminator. Life remains driven thermodynamic constraint-maintenance supported by IPL-mediated Non-Trivial Computation.

The procedure does not add a new life essence. It does not turn dormancy, potential throughput, death, topology, or relationship modifiers into independent life criteria.

The procedure answers a downstream question: where and for which locus is the inherited life relation realised, resumable, potential, or closed; where those relations are not warranted, whether the tested relation is positively excluded under the stated reference conditions or insufficiently established with residual carried.

Definition drift appears when procedure stages are treated as new definitions. Candidate frame becomes life. Boundary becomes life. Continuity becomes life. Potential throughput becomes weak life. Topology becomes life. Audit output becomes ontology.

The correction is to return each term to its function.

Paper 1 defines the life threshold.

The attribution canon defines the attribution relations.

The procedure applies those relations in contested cases.

7.3. Procedure-as-phenomenon error

Procedure-as-phenomenon error occurs when the diagnostic sequence is mistaken for the phenomenon itself.

The stages are ordered for inquiry. Nature is not required to occur in that order. A living regime does not first perform reference preflight, then frame itself, then localise itself, then assign class. The investigator does those things to avoid misclassification.

This error matters because a procedure can become over-mechanical. A reader may treat each stage as a separate property that the candidate must visibly display. That would degrade the method into a checklist.

The correction is to remember that the stages are analytic dependencies.

They tell the investigator what must be clarified before a verdict is warranted.

They are not separate substances inside the candidate.

7.4. Comparator literalism

Comparator literalism occurs when Baseline Dynamics is treated as requiring direct laboratory ablation in every case, or when the absence of direct intervention is treated as automatic attribution failure.

The correction is comparator-discipline grading.

A BD comparator may be experimental, modelled, comparative, historical, inferential, or residual-bearing depending on the domain. Direct intervention strengthens attribution where available, but unavailable intervention does not automatically defeat the audit. It weakens the strength marker and must be carried in residual if the comparator expectation cannot be specified strongly enough.

7.5. Container collapse

Container collapse occurs when the visible boundary is treated as the Attribution Locus.

This failure mode can inflate or deflate life-status. A host cell may be treated as the sole living unit even when a distinct parasite or viral throughput candidate is present. A body may be treated as uniformly alive or uniformly dead when lower-order constituents require separate attribution. A capsid may be treated as a living boundary merely because it encloses viral material. A perfusion apparatus may be treated as a living system merely because it contains living tissue.

The correction is maintained-boundary discipline.

A boundary matters only where it participates in preserving the relevant informational regime. The physical container is a candidate boundary. It is not the Attribution Locus unless the regime relation is attributable to it.

7.6. Activity collapse

Activity collapse occurs when visible activity is treated as life, and inactivity is treated as non-life or death.

This failure mode misclassifies dormant life, terminal active life, and potential throughput.

Dormant life may show reduced activity while preserving intrinsic resumability. Terminal life may show narrowing continuation while remaining actively regime-completing. Life-in-Potential may show no active maintenance while preserving identity-bearing throughput into extrinsic completion. Dead material may preserve recognisable structure while branch-realisation has closed.

The correction is continuity discipline.

The question is not how active the candidate appears.

The question is which future branches remain attributable to the candidate locus.

7.7. Dependence shortcut

Dependence shortcut occurs when dependence is used as a verdict.

One version says: if it depends on another system, it is not alive. Another says: if it is deeply dependent, it must be part of the other system. Both are too coarse.

A parasite may be alive while dependent. A developing organism may be alive while gestationally supported. A machine-supported organism may remain the Attribution Locus. A symbiont may remain distinct despite integration. A free virion may be Life-in-Potential because its completion is host-dependent. A functional sublocus may be essential without being alive at the claimed scale.

The correction is DTS-completion discipline.

The question is not whether the candidate depends.

The question is where the life-realising regime is completed and which locus preserves identity-bearing throughput.

7.8. Replication shortcut

Replication shortcut occurs when copying, reproduction, templating, propagation, or lineage is treated as sufficient for Life.

This error appears in viral, prion, viroid, protocell, synthetic, and molecular cases. A candidate may be copied without maintaining itself. It may template a structure without carrying a life-realising regime. It may belong to a lineage without presently satisfying Life or Life-in-Potential. It may be reconstructable without preserving identity-bearing throughput.

The correction is regime-maintenance discipline.

Replication is relevant only when it participates in maintained, resumable, or potential informational throughput attributable to the candidate.

Copying is not enough.

7.9. Potential inflation

Potential inflation occurs when Life-in-Potential expands to cover any biological material, stored sequence, preserved record, reconstructable template, useful molecule, or life-derived remnant.

This failure mode is especially dangerous because the category is intentionally intermediate. Without discipline, it becomes a catch-all for almost-life.

The correction is throughput-identity discipline.

Life-in-Potential requires identity-bearing distinctions preserved in an organisation capable of entering an admissible life-realising completion pathway such that those distinctions become counterfactually operative in the later regime.

A record is not enough.

A sequence is not enough.

Usefulness is not enough.

Reconstructability is not enough.

Potential throughput must remain attributable to the candidate.

7.10. Dormancy-potential confusion

Dormancy-potential confusion occurs when dormant Life is treated as Life-in-Potential.

The two statuses are distinct.

Dormant Life preserves intrinsic resumability. It is Life because the same Attribution Locus remains intrinsically resumable under permissive conditions. Life-in-Potential does not preserve active life-realisation or intrinsic resumption. It preserves identity-bearing throughput into extrinsic completion.

A seed, spore, cyst, or cryopreserved bacterium is not Life-in-Potential merely because it is inactive. If intrinsic resumability has failed, the candidate has closed continuity at that target locus and its remaining material requires renewed attribution. It remains Life where intrinsic resumability remains preserved.

The correction is intrinsic-resumability discipline.

Ask whether the candidate itself resumes life-realisation, or whether another locus must complete its retained distinctions.

7.11. Death overextension

Death overextension occurs when death of a target locus is imposed on all constituents.

A dead organism is not one uniform classification spread across every remaining part. Death closes the organismal locus. It does not automatically close every cell, microbe, parasite, viral candidate, molecule, record, or potential throughput path inside the former body.

The correction is post-death constituent reframing.

After target-locus death, the remaining field must be reframed. Some constituents may be Life. Some may be Life-in-Potential. Some may be Complex Chemistry. Some may be incorporated. Some may be reconstructed. Some may require residual where discriminator conditions remain incomplete.

Death closes a branch.

It does not remove the need for attribution.

7.12. Topology shortcut

Topology shortcut occurs when relationship terms decide class.

Parasite, symbiont, organelle, tissue, organ, scaffold, host, colony, corpse, tumour, and component are relation terms or candidate selectors. They do not decide primary status by themselves.

The correction is ordering discipline.

Assign primary class and continuity status before topology where possible. If topology is needed to determine completion, use it provisionally and return to class only after the relevant locus has been identified.

A topology term should never be allowed to carry an unstated life verdict.

7.13. Residual laundering

Residual laundering occurs when unresolved uncertainty is hidden inside a confident category.

This can happen in both directions. A candidate may be declared alive because refusing closure feels conservative, generous, or biologically intuitive. A candidate may be declared non-living because admitting residual feels untidy. A candidate may be declared Life-in-Potential because it is convenient to avoid the alive/not-alive dispute. A candidate may be declared merely chemical because its completion pathway is unfamiliar.

The correction is residual discipline.

Where discriminator conditions are incomplete, the audit must state which relation remains underdetermined. The residual must not become an explanation. It must not be hidden under a noun. It must remain available for update.

7.14. False equivalence

False equivalence occurs when unresolved possibilities are treated as equally live merely because none has been finally closed.

Residual does not flatten alternatives. A candidate may carry residual between Life-in-Potential and Complex Chemistry while one formulation is better supported than the other. A mitochondrion may carry residual between functional sublocus and constitutively dependent maintained organisation while organismal Life is unsupported. A tumour-scale candidate may carry residual while cellular Life is clear.

The correction is differentiated residual support.

The audit should state not only what remains possible, but which candidate outputs are stronger, weaker, unavailable, or dependent on future evidence.

Residual is not undifferentiated.

7.15. Guardrail compression

The guardrails compress to one practical rule.

Do not classify by familiar sign where the attribution relation has not been established.

Membrane is not locus.
Activity is not life.
Inactivity is not death.
Dependence is not non-life.
Replication is not life.
Sequence is not potential throughput.
Death of the whole is not death of every part.
Topology is not class.
Residual is not explanation.

These statements are compressed warnings. They do not replace the procedure.

They protect it.

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8. Compression and handoff

8.1. What the procedure has shown

The procedure shows that life attribution is not a direct move from object to verdict. It is a disciplined movement through relations.

Paper 3 operationalises the attribution canon without redefining it. The inherited order is: candidate frame, reference conditions, life-realisation threshold, Attribution Locus, DTS completion, identity-bearing continuity, primary class or residual deferral, topology, and residual/update statement.

This order prevents familiar nouns, containers, activity levels, dependence relations, lineage histories, topology terms, or unresolved evidence from becoming disguised verdicts. A seed is not classified by inactivity. A terminal organism is not classified by approaching death. A free virion-like candidate is not classified by lack of active metabolism alone. A lysed infected cell is not one uniform scene. A parasite is not classified by dependence alone. A mitochondrion is

not classified by the word organelle. A tumour is not classified by pathology alone. A perfused organ is not classified by the life of its cells alone. A protocell-like system is not classified by resemblance alone. A corpse is not classified without constituent reframing.

The procedure therefore converts edge cases from disputes over nouns into audits of relation.

8.2. The stable output grammar

The primary classification remains Complex Chemistry, Life-in-Potential, and Life.

Complex Chemistry applies where life-realising maintenance, intrinsic resumability, and identity-bearing potential throughput are not established or are positively excluded under the stated frame. Life-in-Potential applies where a non-life-realised candidate preserves identity-bearing potential informational throughput into admissible extrinsic life-realising completion. Life applies where the correctly attributed Attribution Locus actively realises or intrinsically resumes driven constraint-maintenance through distinction-conditioned organisation.

The formal continuity statuses are active, dormant, terminal active, potential, and closed. Death remains the ordinary-language name for closed continuity of a formerly living target locus whose future branch-realisation has closed. In formal procedure, that case is recorded through closure output rather than primary-class assignment.

Reconstruction and incorporation remain cross-locus descriptors. They are not intrinsic resumption and not primary classes. Topology remains secondary: it describes relations among already-attributed loci. Residual remains explicit: unresolved discriminator conditions are handled through residual and update conditions, not as class, continuity status, or topology.

8.3. What the edge cases demonstrated

The exemplar desktop studies show that the procedure does not need special exceptions for familiar difficult cases.

Dormant cases preserve Life where intrinsic same-locus resumability remains. Terminal cases remain Life until branch closure. Free virion-like candidates may be Life-in-Potential where identity-bearing potential throughput into admissible host completion is established. Productive infection and lysis show that one physical scene may split into closure output, Life-in-Potential, Complex Chemistry, living subloci, incorporated material, reconstruction material, and residual-bearing remnants.

Parasites, organelles, tumours, perfused organs, artificial womb cases, prions, viroids, synthetic protocells, and post-death remains all require attribution rather than special theoretical exemption. Their difficulty lies in locus, completion, continuity, topology, and residual, not in a failure of the canon.

8.4. Why the procedure requires reference discipline

This procedure makes clear why life attribution requires full reference discipline.

Every verdict depends on locus, boundary, interface, scale, operational horizon, driving conditions, discrimination/noise regime, comparator assumptions, continuity, topology, residual, and update condition. A life claim without those conditions is underdetermined. It may function in ordinary language, but it cannot support contested attribution.

The candidate frame is already a life-domain expression of reference discipline. It asks: for what locus, through what interface, under what boundary, at what scale, over what horizon, under what driving conditions, and under what discrimination/noise regime is this life claim being made?

The audit template makes the same demand operational. It shows that the life question cannot be asked from nowhere. It must be indexed before it can be answered.

Information does not become disciplined by being named. It becomes disciplined when the reference conditions under which distinction is carried, registered, retained, applied, completed, or closed are made explicit.

Life attribution is one domain in which that discipline becomes unavoidable.

8.5. Handoff to further application

The present paper supplies the general procedure and demonstrates it across edge cases. It does not exhaust application.

Further work may apply the same audit form to origin-of-life systems, synthetic biology, artificial life, organoid systems, xenobots, engineered cells, virome ecology, host-microbiome systems, ecological superorganisms, post-death biological persistence, digital life claims, and hybrid bio-technical regimes.

Those applications should not redefine the conceptual canon. They should inherit the attribution architecture and state their residuals clearly.

Where life-realisation, Attribution Locus, DTS completion, and identity-bearing continuity are established, Life may be attributed.

Where identity-bearing potential throughput into admissible extrinsic completion is established without active life-realisation, Life-in-Potential may be attributed.

Where neither is warranted and no residual blocks primary-class assignment, Complex Chemistry is assigned.

Where a formerly living target locus has no future branch-realisation as that locus, closure output should be used.

Where the discriminator conditions remain incomplete, no stronger field should be forced; residual and update condition should be recorded.

8.6. Closing statement

The procedure does not ask whether a familiar object deserves the word life.

It asks what relation is present, for which locus, through what boundary or interface, at what scale, over what horizon, with what DTS-completion relation, with which continuity status, and with what residual.

Life attribution is performed by following informational throughput through locus, completion, continuity, class, topology, and residual. Some cases warrant primary-class assignment. Some warrant closure output. Some require residual inventory because a discriminator condition remains incomplete.

Life is not found by staring harder at the object.

It is located by following the throughput through its attributed locus, DTS-completion relation, continuity, class, topology, and residual.

Endnotes

[1] Neveu et al. (2018), Green et al. (2021), and Parenteau et al. (2025) provide methodological comparators for staged life-detection claims, graded evidential strength, and false-positive/false-negative control. They do not supply the present attribution sequence, Attribution Locus, DTS-completion, continuity, class, topology, or residual architecture; no technical dependence is claimed.

[2] Lennon and Jones (2011) review dormancy as a reversible state of reduced metabolic activity in which organisms may later resuscitate. This supports the empirical possibility of low-activity yet resumable biological states; the GOT classification of dormant Life is not inherited from that literature.

[3] Jeffries et al. (2011) document physiological change during final maturation and senescence in male sockeye salmon, including continued physiological operation through the terminal reproductive phase. The source supports the biological exemplar; 'terminal active' is the present framework's continuity classification.

[4] Forterre (2011) distinguishes the inert virion from the intracellular 'virocell' phase in which viral synthesis is performed. This is a close comparator to free-phase/host-completed attribution, but Life-in-Potential is not inherited from the virocell concept.

[5] Salje (2021) reviews Rickettsiales as obligate intracellular bacteria and describes their deeply host-dependent cellular lifestyles. The source supports dependence without automatic loss of cellular biological organisation; the life-attribution verdict remains governed by the present discriminator.

[6] Roger, Munoz-Gomez, and Kamikawa (2017) review mitochondrial origin and integration, including genome reduction, protein import, metabolic integration, and dependence on the host cell. This supports the empirical basis for treating mitochondrion-scale attribution as a locus/completion question rather than settling it by the noun 'organelle'.

[7] Merlo et al. (2006) describe neoplasms as evolving ecological populations of cells exhibiting mutation, competition, cooperation, and selection. This supports the tumour exemplar's cellular and population-level organisation; it does not establish tumour-scale Attribution Locus or higher-order Life.

[8] Nasralla et al. (2018) show that normothermic machine perfusion can maintain donor livers in a physiological state during preservation, while Huh et al. (2010) demonstrate organ-level lung functions in a microengineered device. These sources support viable tissue/organ function under external technical support; neither is treated as evidence that the organ or device-supported system is an organismal living locus.

[9] Partridge et al. (2017) report an extra-uterine system that physiologically supported extremely premature lambs in a womb-like fluid environment while growth and maturation continued. This supports the developmental-support exemplar; the attribution of the developing organism as locus is not inherited from the engineering study.

[10] Prusiner (1982) established a proteinaceous infectious particle as the scrapie agent; Diener (1971) characterised the viroid as a replicating low-molecular-weight RNA dependent largely on host biosynthetic systems. These sources support the contrasting molecular propagation cases; prion or viroid status under the Life/Life-in-Potential/Complex Chemistry ladder remains an attribution question here.

[11] Szostak, Bartel, and Luisi (2001) frame synthetic-cell research around assembling minimal cellular functions from protocell-like components. This is a comparator for the chemistry-to-life band, not a source of the present life discriminator.

[12] Latil et al. (2012) show that skeletal muscle stem cells can enter a dormant state post mortem and retain regenerative capacity. This supports the claim that organismal death need not immediately erase all lower-order living cellular loci; constituent attribution remains separate from organismal closure.

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