

Task Graph & Cache Contract v1

Turborepo task graph and cache evidence

Outcome. Predict and verify task-graph, fingerprint, cache, output, and oracle behavior so a cache hit is never promoted into an unsupported correctness claim.

Evidence gate. A cache conclusion is review-ready only when prediction, declared graph/input/env/output state, observed cache state, and oracle result agree.

DAG → Fingerprint → Cache → Output → Oracle

01 TASK DAG Authority: turbo.json dependsOn declarations Boundary: Package relationships do not automatically declare task order	02 FINGERPRINT Authority: Inputs, task config, and relevant environment Boundary: An omitted semantic input cannot invalidate the key	03 CACHE Authority: Observed miss/hit and local-only cache scope Boundary: A hit reports reuse, not semantic correctness
04 DECLARED OUTPUT Authority: outputs globs and restored files Boundary: Log replay is not artifact restoration	05 INDEPENDENT ORACLE Authority: Expected source hash plus APP_FLAVOR Boundary: Oracle ignores cache metadata and can reject stale green output	

Identity, decision, and safety

Learner		Reviewer	
Case / attempt		Capture date	
Target context		Decision	ACCEPT / REJECT / DEFER

Safety boundary. Use only the supplied local fixture. No credentials, privileged host changes, broad environment dump, or network provisioning is required. TURBO_UNAVAILABLE remains missing runtime evidence; no simulated hit or miss is accepted.

Required record fields and evidence tests

A field is complete only when its value is bounded, traceable, and classified. Use UNKNOWN when the required observation is unavailable or contradictory.

Field	Question to close	Minimum evidence	Invalid promotion
task	What does task mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
declared_dependencies	What does declared dependencies mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
declared_inputs	What does declared inputs mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
relevant_env	What does relevant env mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
declared_outputs	What does declared outputs mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
baseline_cache_state	What was actually observed for baseline cache state?	Exact command, clean-state action, stdout/stderr, exit status	One green signal proves the whole claim
mutation	What does mutation mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
predicted_invalidation	What does predicted invalidation mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
observed_cache_state	What was actually observed for observed cache state?	Exact command, clean-state action, stdout/stderr, exit status	One green signal proves the whole claim
artifact_oracle	What bounded local evidence supports artifact oracle?	Named boundary, inventory/integrity, declaration or locator	Warm or host-global state is assessed closure
decision	How is decision bounded and justified?	Allowed enum, evidence refs, rationale, next probe	A formula or tool owns the human decision
residual_boundary	How is residual boundary bounded and justified?	Allowed enum, evidence refs, rationale, next probe	A formula or tool owns the human decision

Evidence and failure states

Evidence: OBSERVED / INFERRED / UNKNOWN. Decisions: ACCEPT / REJECT / DEFER. Failure layers: GRAPH_EDGE / FINGERPRINT_INPUT / ENV_INPUT / OUTPUT_RESTORE / RUNTIME_OR_TOOL_CONTEXT / UNKNOWN_OR_MULTIPLE.

Task Graph, Fingerprint, Cache, Output, and Oracle Contract

Canonical English source: TOL003-T1.example.en-US.csv. This example demonstrates field relationships; it does not supply the learner's mutation, transfer, or final decision evidence.

Field	Canonical value	Evidence question	Boundary check
task	@tol003/core#build	What observation supports task?	Is the conclusion no stronger than this value?
declared_dependencies	none	What observation supports declared dependencies?	Is the conclusion no stronger than this value?
declared_inputs	src/**	What observation supports declared inputs?	Is the conclusion no stronger than this value?
relevant_env	APP_FLAVOR (initially omitted)	What observation supports relevant env?	Is the conclusion no stronger than this value?
declared_outputs	dist/**	What observation supports declared outputs?	Is the conclusion no stronger than this value?
baseline_cache_state	MISS then HIT	What observation supports baseline cache state?	Is the conclusion no stronger than this value?
mutation	APP_FLAVOR vanilla -- chocolate	What observation supports mutation?	Is the conclusion no stronger than this value?
predicted_invalidation	MISS only after env declaration	What observation supports predicted invalidation?	Is the conclusion no stronger than this value?
observed_cache_state	OBSERVE	What observation supports observed cache state?	Is the conclusion no stronger than this value?
artifact_oracle	compare source_hash+flavor	What observation supports artifact oracle?	Is the conclusion no stronger than this value?
decision	DEFER until oracle	What observation supports decision?	Is the conclusion no stronger than this value?
residual_boundary	remote/toolchain outside claim	What observation supports residual boundary?	Is the conclusion no stronger than this value?
Canonical validation	37/37 PASS · QA_ACCEPTED_ELIGIBLE		

Complete Task Graph & Cache Contract v1

Enter one bounded value per required field. Every material entry needs an evidence locator and a state. Use additional rows in the workbook when the artifact needs multiple ecosystem, task, dependency, or probe records.

Required field	Learner value	Evidence locator	State / review note
task			OBSERVED / INFERRED / UNKNOWN
declared_dependencies			OBSERVED / INFERRED / UNKNOWN
declared_inputs			OBSERVED / INFERRED / UNKNOWN
relevant_env			OBSERVED / INFERRED / UNKNOWN
declared_outputs			OBSERVED / INFERRED / UNKNOWN
baseline_cache_state			OBSERVED / INFERRED / UNKNOWN
mutation			OBSERVED / INFERRED / UNKNOWN
predicted_invalidation			OBSERVED / INFERRED / UNKNOWN
observed_cache_state			OBSERVED / INFERRED / UNKNOWN
artifact_oracle			OBSERVED / INFERRED / UNKNOWN
decision			OBSERVED / INFERRED / UNKNOWN
residual_boundary			OBSERVED / INFERRED / UNKNOWN

Human closure

Decision	ACCEPT / REJECT / DEFER	Reviewer	
Residual uncertainty		Consequence	
Smallest next probe		Evidence owner / date	

Predict → reset → mutate one boundary → observe → classify

Do not stack mutations. Reset before every case so the evidence identifies the smallest changed layer.

Case	Controlled change	Prediction	Deciding evidence	Learner observation	Stable / unresolved boundary
BASELINE MISS → HIT	Same source and APP_FLAVOR=vanilla are run twice	First miss, then eligible hit	Task config, local cache evidence, artifact oracle PASS	_____	_____
UNDECLARED ENV	APP_FLAVOR changes to chocolate while omitted from env	Key may reuse stale vanilla output	Green reuse can coexist with oracle FAIL	_____	_____
ENV REPAIR	APP_FLAVOR is added to declared environment inputs	Value change invalidates the fingerprint	Miss followed by chocolate artifact and oracle PASS	_____	_____
GRAPH EDGE	verify loses dependsOn: ["^build"]	Clean verify lacks guaranteed upstream build	Declared DAG and artifact availability expose the boundary	_____	_____

Lab command plan

Phase	Command or action	Required capture	Truth rule
Baseline	python setup_fixture.py	Identity, exact output, exit status, evidence locator	TURBO_UNAVAILABLE remains missing runtime evidence; no simulated hit or miss is accepted.
Baseline	python inspect_context.py	Identity, exact output, exit status, evidence locator	TURBO_UNAVAILABLE remains missing runtime evidence; no simulated hit or miss is accepted.
Baseline	python run_turbo_probe.py vanilla build	Identity, exact output, exit status, evidence locator	TURBO_UNAVAILABLE remains missing runtime evidence; no simulated hit or miss is accepted.
Baseline	python artifact_oracle.py vanilla	Identity, exact output, exit status, evidence locator	TURBO_UNAVAILABLE remains missing runtime evidence; no simulated hit or miss is accepted.
Mutation	python mutate_fixture.py declare-env	Reset receipt, prediction, changed and stable evidence	No unavailable runtime or simulated output is a pass
Mutation	python mutate_fixture.py remove-dependency-edge	Reset receipt, prediction, changed and stable evidence	No unavailable runtime or simulated output is a pass
Mutation	python mutate_fixture.py break-outputs	Reset receipt, prediction, changed and stable evidence	No unavailable runtime or simulated output is a pass

Guardrail. A high hit rate or green cache signal cannot compensate for an undeclared semantic input.

Changed-context transfer

Evaluate generated-file and REGION inputs without sequence hints

Transfer item	Changed-context requirement	Learner evidence	Review check
Authority	Re-read and hash the actual changed declarations.	_____	Baseline authority not copied
Identity / target	Capture actual tool/runtime identity and target assumptions.	_____	Previous identity not reused
Lock / fingerprint	Apply this tool's own semantics and preserve stable state.	_____	No generic flag definition
Local artifacts	Re-inventory the changed store, cache, wheelhouse, or path inputs.	_____	Availability bound to target
Clean observation	Remove warm state and retain exact command/output/exit evidence.	_____	Warm success excluded
Decision	Choose only ACCEPT / REJECT / DEFER.	_____	Residual and next probe stated

Non-compensatory review

Critical dimension	PASS / REPAIR	Evidence locator	Repair or rationale
Authority and boundary correctness	_____ _____	_____	_____
Identity, target, and artifact traceability	_____ _____	_____	_____
Clean execution and independent observable	_____ _____	_____	_____
Mutation isolation and failure-layer classification	_____ _____	_____	_____
Transfer, residual uncertainty, and non-goals	_____ _____	_____	_____

Canonical QA gate

Validation	37/37 PASS	Disposition	QA_ACCEPTED_ELIGIBLE
Blocker / note	No canonical-source blocker recorded.	Clearance receipt	_____

Media decision. Deck and video are NOT_APPLICABLE_WITH_RATIONALE; the local fixture and editable evidence artifacts are the assessed support.