Exact Toolchain Closure Manifest v1

Exact toolchain closure and offline reproducibility

Outcome. Combine pnpm, uv, and Cargo evidence categories without conflating tool semantics, then issue only ACCEPT_BOUNDED, BLOCKED_MISSING_EVIDENCE, or REGENERATE_AFTER_DRIFT.

Evidence gate. Every required ecosystem edge must have authority, identity, lock, artifact, clean-state, and locator evidence; one missing required runtime blocks the chapter-exit sentence.

Authority → Identity → Locks → Artifacts → Clean Reconstruction → Residuals

01 AUTHORITY **Authority: Workspace and ecosystem configuration files** **Boundary: Define exactly which fixture and declarations are in scope**	**02 TOOL / RUNTIME** **Authority: Node, pnpm, Python, uv, cargo, rustc, rustup identities** **Boundary: Stable locks do not preserve executable identity**	**03 LOCKS** **Authority: pnpm-lock.yaml, uv.lock, Cargo.lock** **Boundary: Each tool owns its locked/frozen/offline semantics**
04 LOCAL ARTIFACTS **Authority: Store, wheelhouse, path dependencies, inventories** **Boundary: Availability and provenance are separate questions**	**05 CLEAN RECONSTRUCTION** **Authority: Removed node_modules, .venv, target and per-tool probes** **Boundary: Warm success is never clean reconstruction**	**06 RESIDUAL / DECISION** **Authority: Relevant env, target assumptions, mutations, residuals** **Boundary: Use only bounded, blocked, or regenerate decisions**

Identity, decision, and safety

Learner		**Reviewer**	
Case / attempt		**Capture date**	
Target context		**Decision**	ACCEPT_BOUNDED / BLOCKED_MISSING_EVIDENCE / REGENERATE_AFTER_DRIFT

Safety boundary. Use only the supplied local fixture. No credentials, privileged host changes, broad environment dump, or network provisioning is required. Missing required runtime is non-zero RUNTIME_EVIDENCE_INCOMPLETE; confirmed failure dominates as RECONSTRUCTION_FAIL.

TOL-006 FIELD GUIDE

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
layer	What does layer mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
authority_file_or_source	What does authority file or source mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
hash_or_identity	Which exact hash or identity was observed?	SHA-256 plus source path and capture context	A hash alone proves semantic sufficiency
tool_runtime_target	Which tool runtime target is bound to this run?	Resolved executable, version/selector, platform or target	A lockfile supplies runtime identity
lock_state	What does lock state mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
local_artifact_inventory	What bounded local evidence supports local artifact inventory?	Named boundary, inventory/integrity, declaration or locator	Warm or host-global state is assessed closure
relevant_env_system_assumption	What does relevant env system assumption mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
clean_offline_check	What was actually observed for clean offline check?	Exact command, clean-state action, stdout/stderr, exit status	One green signal proves the whole claim
mutation_result	What was actually observed for mutation result?	Exact command, clean-state action, stdout/stderr, exit status	One green signal proves the whole claim
evidence_locator	What does evidence locator mean in this case?	Exact authority or observable plus locator	Inference can be relabeled as observation
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_BOUNDED / BLOCKED_MISSING_EVIDENCE / REGENERATE_AFTER_DRIFT. Failure layers: AUTHORITY_WORKSPACE / TOOL_RUNTIME_IDENTITY / ECOSYSTEM_LOCK / LOCAL_ARTIFACTS / RELEVANT_ENVIRONMENT_TARGET / CLEAN_OFFLINE_RECONSTRUCTION / RESIDUAL_BOUNDARY.

TOL-006 CANONICAL EXAMPLE

Exact Toolchain Closure Manifest

Canonical English source: TOL006-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
layer	uv/Python	What observation supports layer?	Is the conclusion no stronger than this value?
authority_file_or_source	pyproject.toml + uv.lock	What observation supports authority file or source?	Is the conclusion no stronger than this value?
hash_or_identity	OBSERVED hashes	What observation supports hash or identity?	Is the conclusion no stronger than this value?
tool_runtime_target	uv + Python identity	What observation supports tool runtime target?	Is the conclusion no stronger than this value?
lock_state	OBSERVED	What observation supports lock state?	Is the conclusion no stronger than this value?
local_artifact_inventory	wheelhouse inventory	What observation supports local artifact inventory?	Is the conclusion no stronger than this value?
relevant_env_system_assumption	MAKNOW_PROFILE=lab	What observation supports relevant env system assumption?	Is the conclusion no stronger than this value?
clean_offline_check	clean uv sync --locked --offline	What observation supports clean offline check?	Is the conclusion no stronger than this value?
mutation_result	baseline	What observation supports mutation result?	Is the conclusion no stronger than this value?
evidence_locator	evidence/uv-baseline.json	What observation supports evidence locator?	Is the conclusion no stronger than this value?
decision	ACCEPT_BOUNDED	What observation supports decision?	Is the conclusion no stronger than this value?
residual_boundary	OS/native/time/locale outside claim	What observation supports residual boundary?	Is the conclusion no stronger than this value?
Canonical validation	**40/41 PASS in isolated execution · QA_BLOCKED_RUNTIME_COMPATIBILITY**		

TOL-006 BLANK RECORD

Complete Exact Toolchain Closure Manifest 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
layer	_____	_____	OBSERVED / INFERRED / UNKNOWN
authority_file_or_source	_____	_____	OBSERVED / INFERRED / UNKNOWN
hash_or_identity	_____	_____	OBSERVED / INFERRED / UNKNOWN
tool_runtime_target	_____	_____	OBSERVED / INFERRED / UNKNOWN
lock_state	_____	_____	OBSERVED / INFERRED / UNKNOWN
local_artifact_inventory	_____	_____	OBSERVED / INFERRED / UNKNOWN
relevant_env_system_assumption	_____	_____	OBSERVED / INFERRED / UNKNOWN
clean_offline_check	_____	_____	OBSERVED / INFERRED / UNKNOWN
mutation_result	_____	_____	OBSERVED / INFERRED / UNKNOWN
evidence_locator	_____	_____	OBSERVED / INFERRED / UNKNOWN
decision	_____	_____	OBSERVED / INFERRED / UNKNOWN
residual_boundary	_____	_____	OBSERVED / INFERRED / UNKNOWN

Human closure

Decision	ACCEPT_BOUNDED / BLOCKED_MISSING_EVIDENCE / REGENERATE_AFTER_DRIFT	**Reviewer**	_____
Residual uncertainty	_____	**Consequence**	_____
Smallest next probe	_____	**Evidence owner / date**	_____

TOL-006 MUTATION WALKTHROUGH

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
BOUNDED BASELINE	Record identities, locks, artifacts, MAKNOW_PROFILE=lab, and clean each ecosystem	Pass only where every required runtime and reconstruction succeeds	Per-tool receipts plus shared target and residual boundary	_____	_____
MISSING ARTIFACT	Remove the required Python wheel while uv.lock stays fixed	Fail at local artifact availability	Warm state cannot repair clean offline failure	_____	_____
TOOL DRIFT	Expected runtime identity changes while locks remain byte-identical	REGENERATE_AFTER_DRIFT	Identity mismatch is detected before a global claim	_____	_____
ENV MATERIALITY	Change MAKNOW_PROFILE and MAKNOW_NOISE separately	Material profile invalidates; noise alone does not	Only semantically relevant environment enters closure	_____	_____

Lab command plan

Phase	Command or action	Required capture	Truth rule
Baseline	python setup_fixture.py	Identity, exact output, exit status, evidence locator	Missing required runtime is non-zero RUNTIME_EVIDENCE_INCOMPLETE; confirmed failure dominates as RECONSTRUCTION_FAIL.
Baseline	python inspect_closure.py	Identity, exact output, exit status, evidence locator	Missing required runtime is non-zero RUNTIME_EVIDENCE_INCOMPLETE; confirmed failure dominates as RECONSTRUCTION_FAIL.
Baseline	MAKNOW_PROFILE=lab python run_clean_reconstruction.py baseline	Identity, exact output, exit status, evidence locator	Missing required runtime is non-zero RUNTIME_EVIDENCE_INCOMPLETE; confirmed failure dominates as RECONSTRUCTION_FAIL.
Mutation	python mutate_fixture.py remove-python-artifact	Reset receipt, prediction, changed and stable evidence	No unavailable runtime or simulated output is a pass
Mutation	python mutate_fixture.py tool-expectation-drift	Reset receipt, prediction, changed and stable evidence	No unavailable runtime or simulated output is a pass
Mutation	python mutate_fixture.py lock-drift	Reset receipt, prediction, changed and stable evidence	No unavailable runtime or simulated output is a pass
Mutation	Change MAKNOW_PROFILE and MAKNOW_NOISE independently	Reset receipt, prediction, changed and stable evidence	No unavailable runtime or simulated output is a pass

Guardrail. A generic frozen/offline label must never erase tool-specific semantics or turn missing evidence into a pass.

TOL-006 TRANSFER AND REVIEW

Changed-context transfer

Rebuild the manifest for changed identities, one missing artifact, one material env input, and one noise variable

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_BOUNDED / BLOCKED_MISSING_EVIDENCE / REGENERATE_AFTER_DRIFT.	_____	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	40/41 PASS in isolated execution	**Disposition**	QA_BLOCKED_RUNTIME_COMPATIBILITY
Blocker / note	baseline_nonfabrication: current pnpm supply-chain policy rejects the packaged fixture artifact, so baseline becomes RECONSTRUCTION_FAIL while uv passes and Cargo/Rust are unavailable	**Clearance receipt**	_____

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