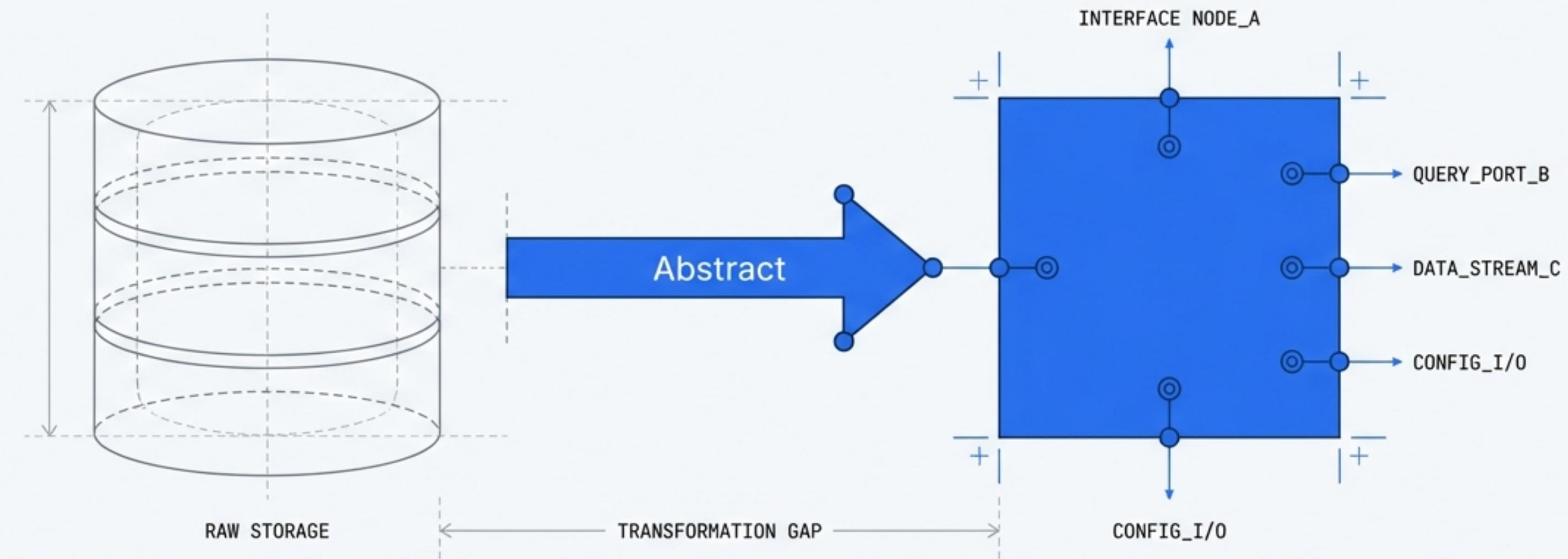


Phase E_3 Storage Module

An Abstraction Layer for Exploratory Development & Rapid Iteration



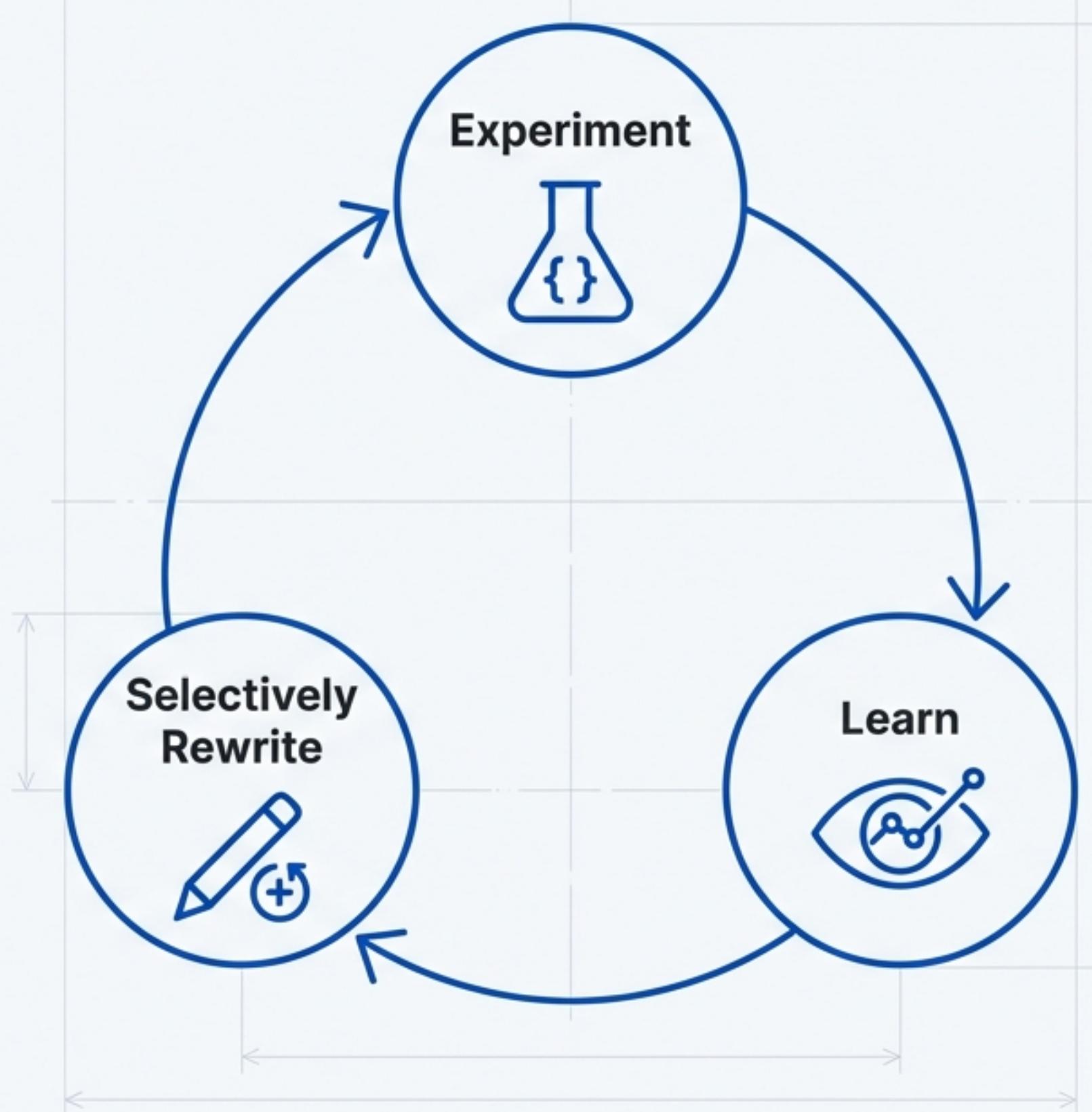
The Philosophy: Build to Learn, Not to Last

Phase experiments are strictly **exploratory development**.

- ④ **Rapid Iteration:** Prioritise discovery over architectural perfection. Code is intentionally rough.
- **Disposable Utility:** Learnings feed the main codebase, but the experimental code itself is often rewritten.
- **Evolutionary:** Expect the brief and requirements to change as unknowns are uncovered.

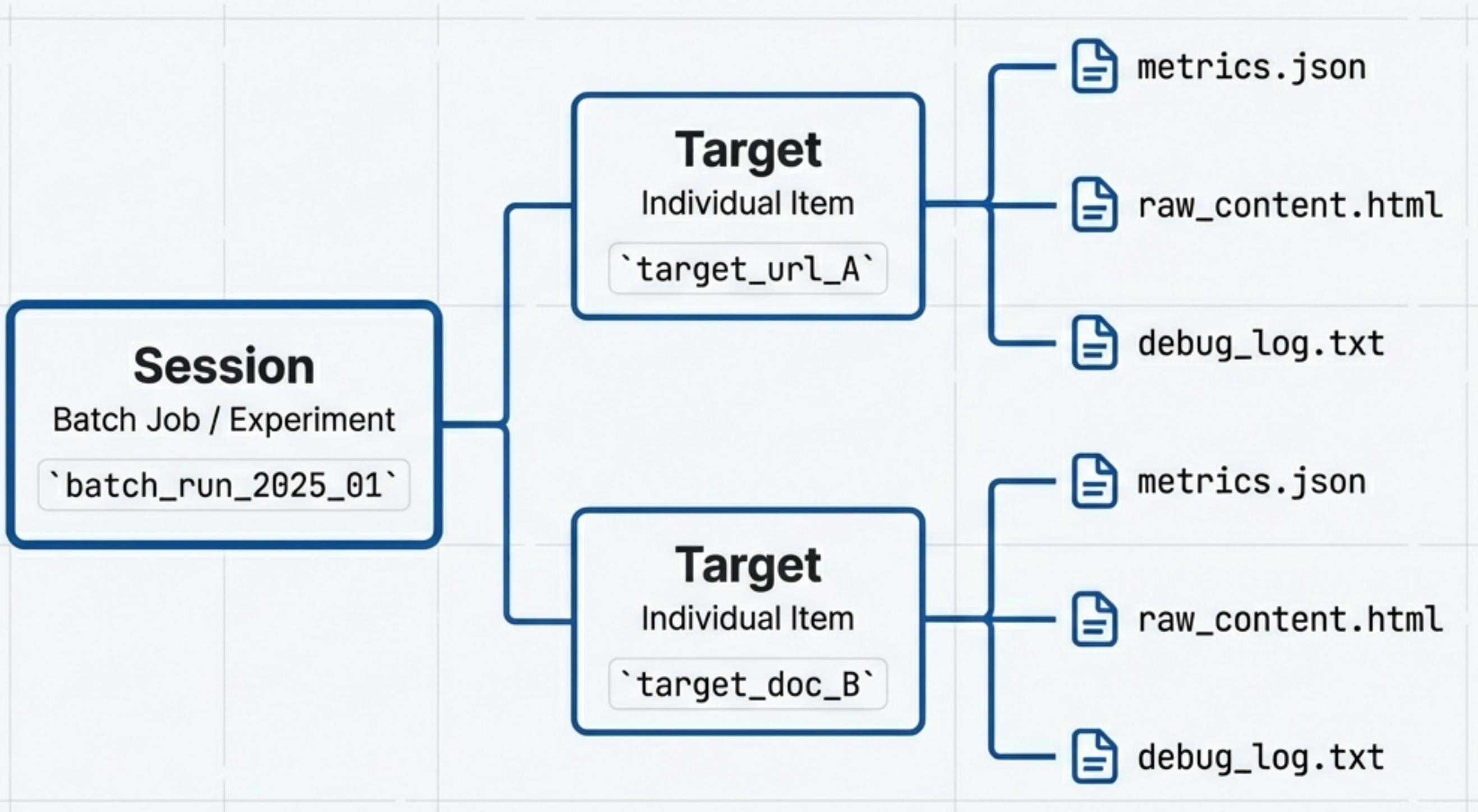
Code is disposable but strategic. We are building knowledge for the next phase.

The Phase Loop



Core Concepts & Hierarchy

Understanding how data is grouped is essential for retrieval.

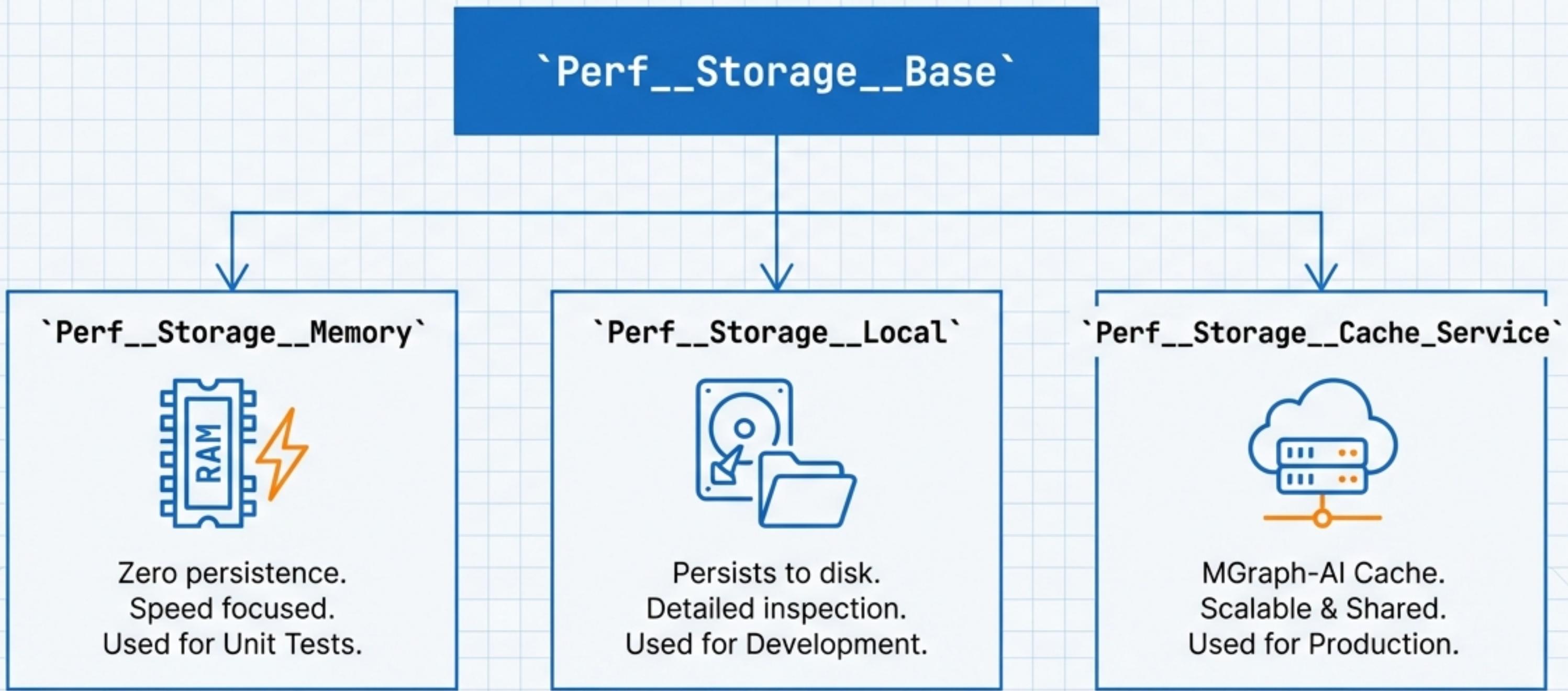


Definitions

- **Session:** The batch job / experiment.
- **Session:** The top-level container for a specific run.
- **Target:** An isolated unit of work within a session.
- **Hierarchy Goal:** Ensures data isolation and predictable retrieval paths.

One Interface, Three Environments

The `Perf__Storage__Base` abstraction unifies distinct backends, allowing logic to remain unchanged across environments.



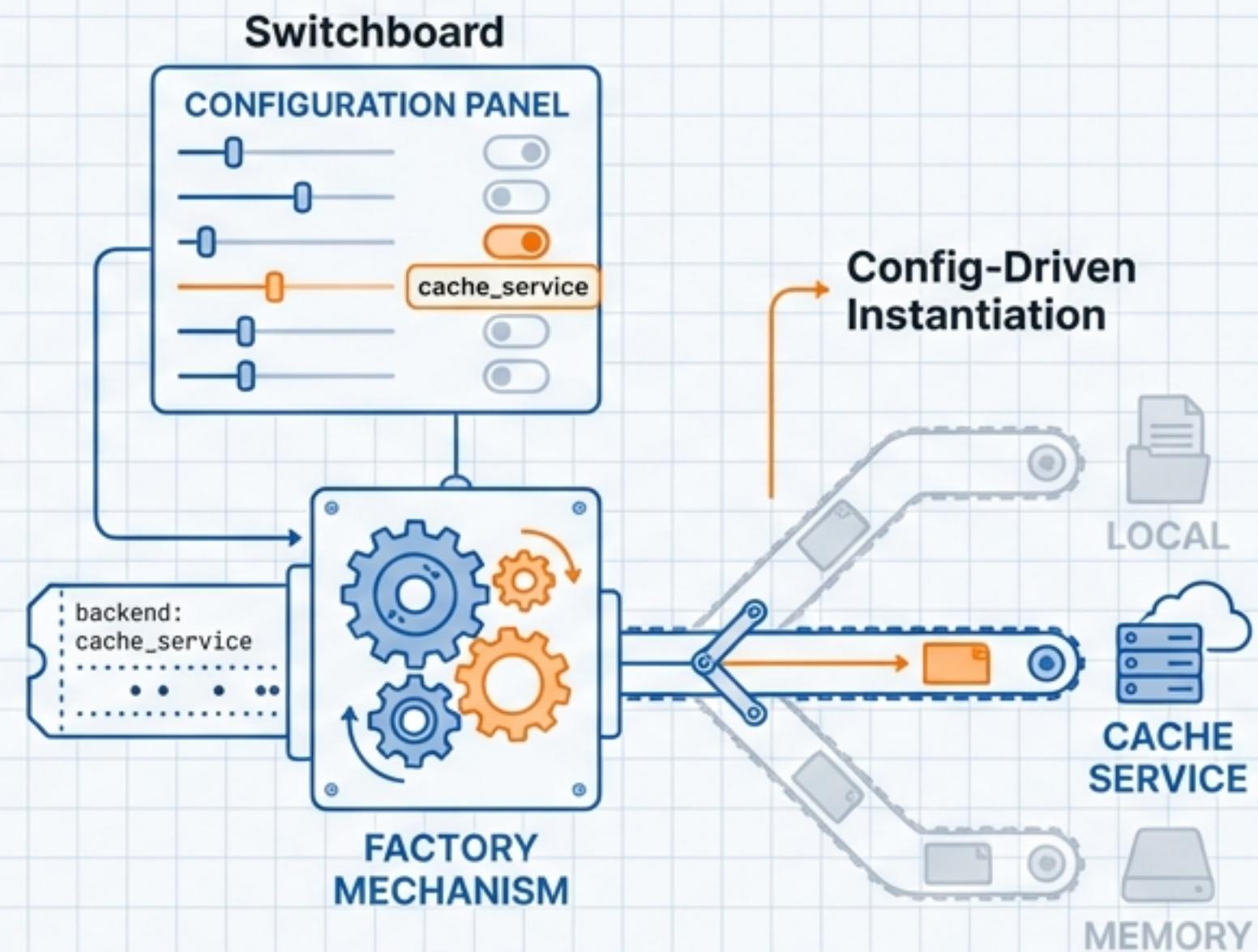
Setup Patterns: The Factory Approach

Decouple configuration from implementation.

```
# Recommended: Factory Pattern with Config
from perf_storage_factory import Perf__Storage__Factory

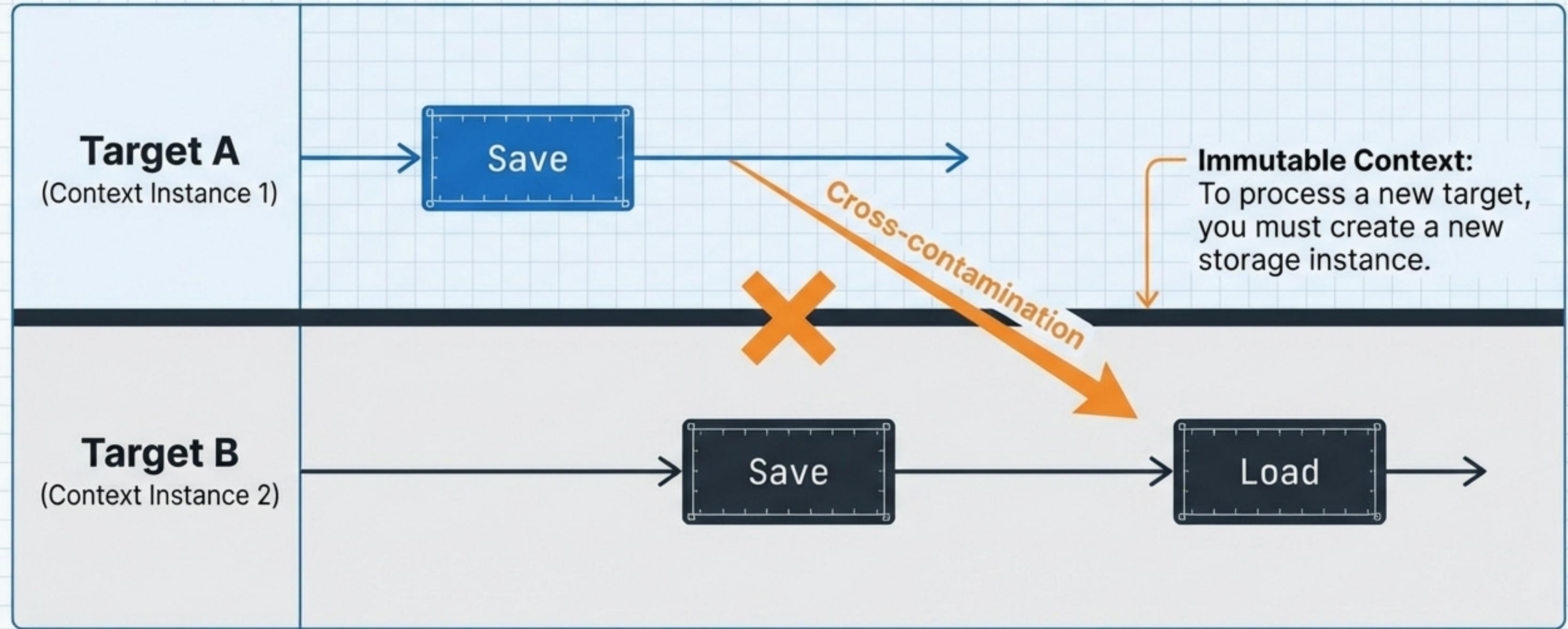
storage_config = {
    "backend": "cache_service", # Options: 'local', 'memory'
    "session_id": "experiment_alpha",
    "target_id": "item_001"
}

# The factory handles the specific backend logic
storage = Perf__Storage__Factory.create(storage_config)
```



Context Management & Isolation

For `Perf__Storage__Cache_Service`, Session and Target are fixed at construction.



Core Operations: The API

Standardising retrieval and persistence verbs.

Method	Data Type	Use Case
save() / load()	JSON / Dictionary	Structured data, metrics, graph representations, metadata.
save_string() / load_string()	Raw String / Text	HTML content, Markdown reports, plain text logs.

Why?

Strategic Distinction: We separate these methods to ensure HTML is rendered as-is (via 'save_string'), while metrics remain structurally queryable (via 'save').

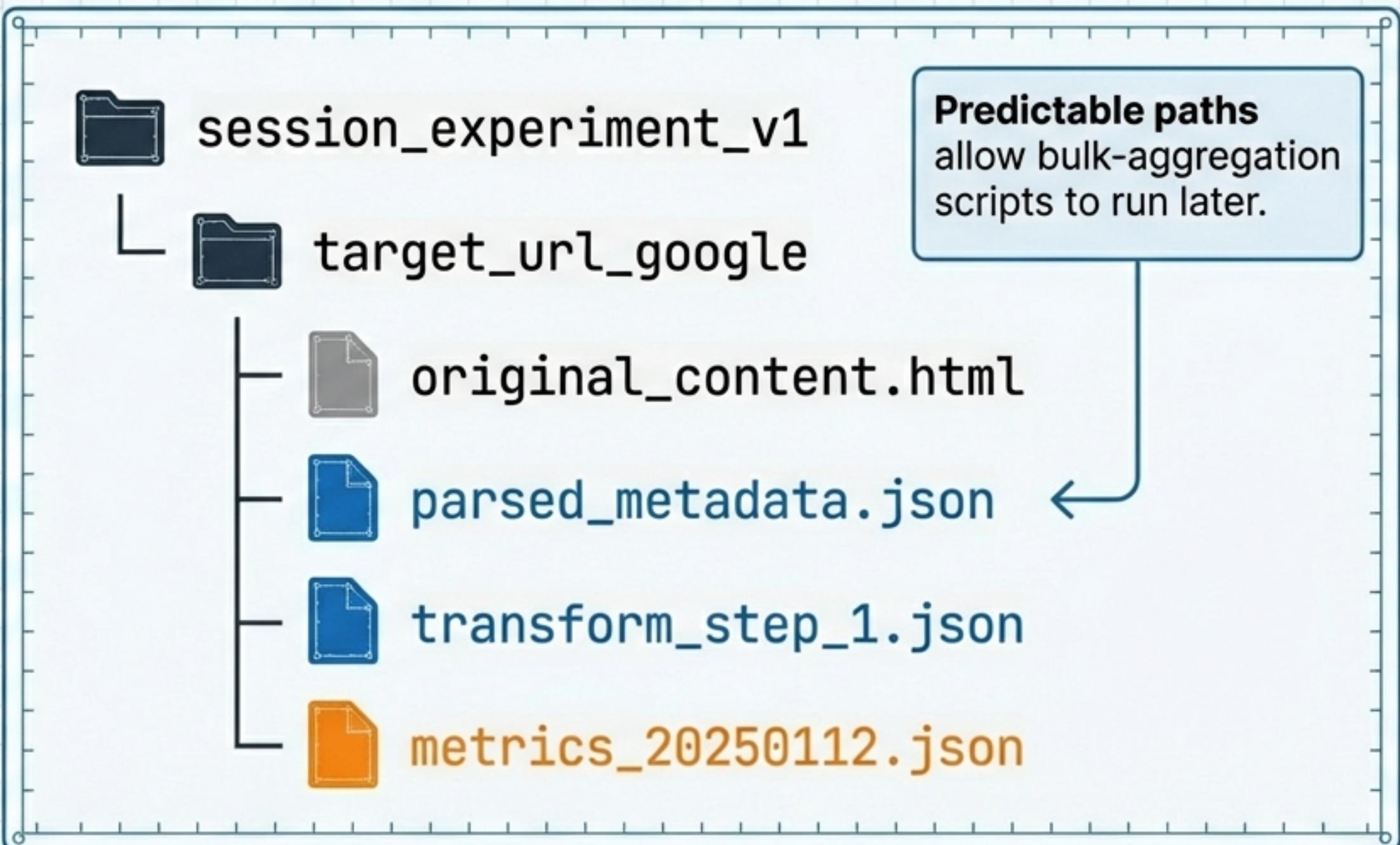
Other API Methods:
exists()
delete()

File Organisation Standards

Consistent naming enables future automation.

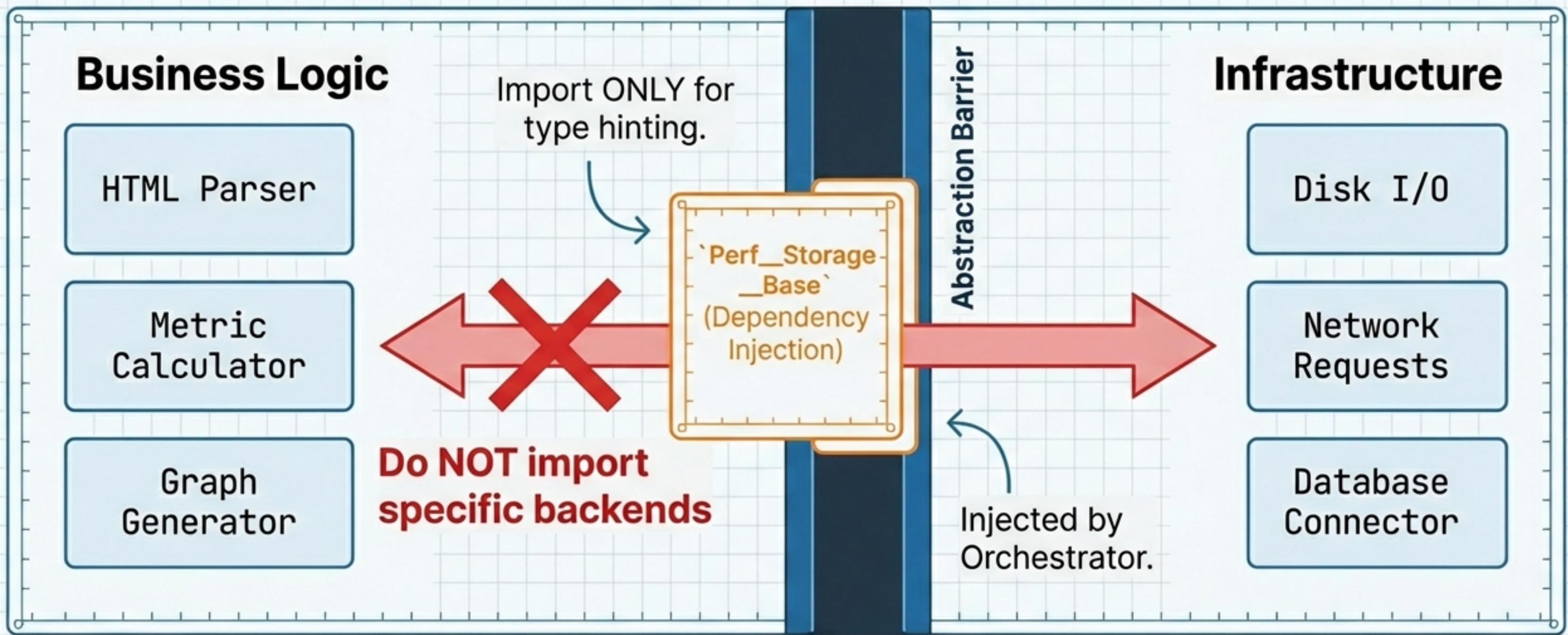
Text Rules

- 1. General:** Use `'snake_case.ext'`.
- 2. Snapshots:** Use descriptive names for state (e.g., `'before_transform'`).
- 3. Versioning:** Append timestamps for outputs.



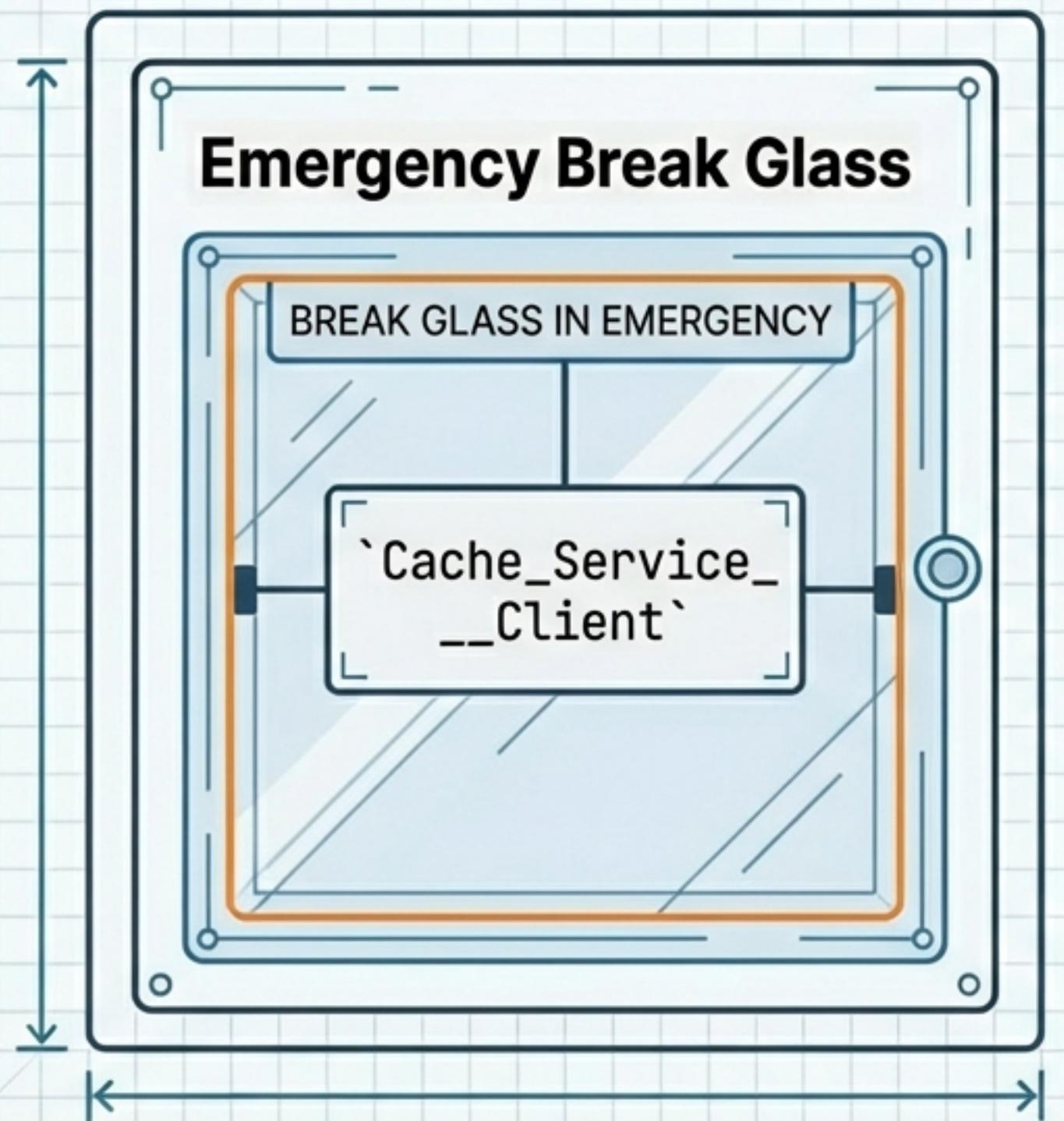
The Golden Rule: Backend Agnosticism

Your transformation code should not know where data lives.



Direct Cache Service Access

Breaking the glass: When the abstraction layer isn't enough.



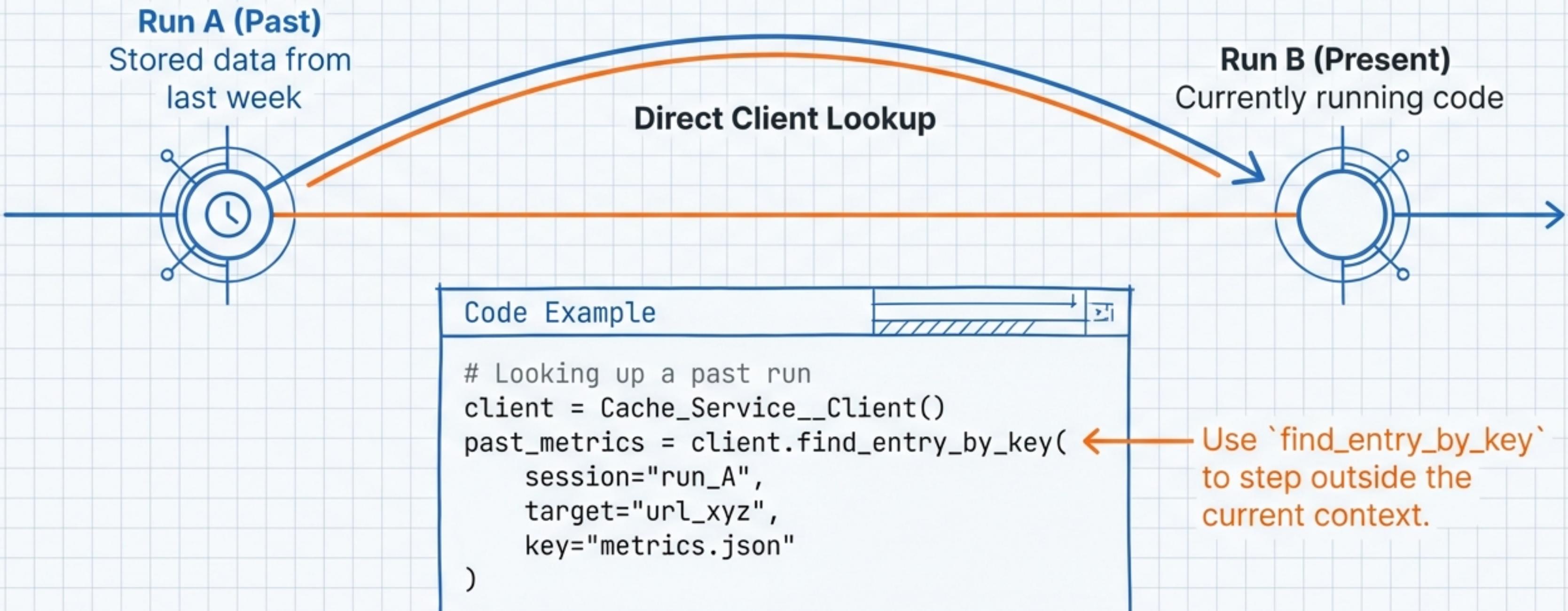
Authorized Use Cases

- Cross-Session Lookups:** Comparing against previous baselines.
- Hash Queries:** Checking if content was already processed (de-duplication).
- Bulk Operations:** Efficient multi-target queries.
- Debugging:** Inspecting raw cache structure.

Warning: Direct access couples code to the Cache Service backend. Use sparingly.

Cross-Session & Target Access

Techniques for looking up past data.



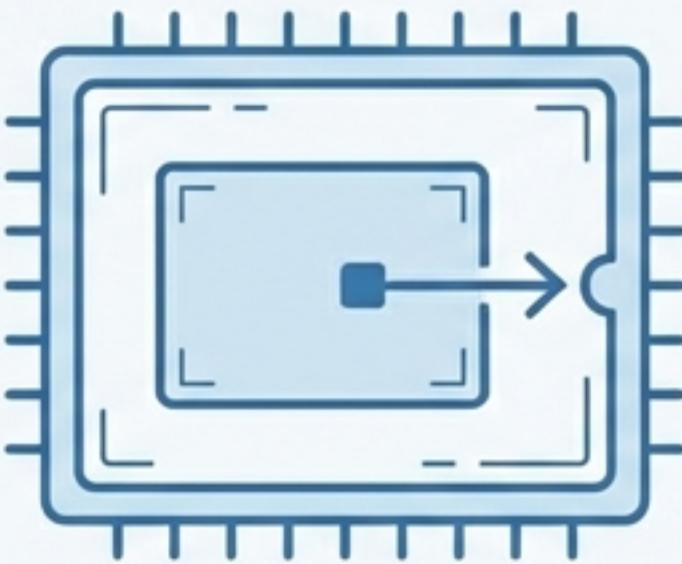
Testing Patterns

Test fast, test safely.



Unit Tests

Use `Perf__Storage__Memory`.
In-memory dict with zero I/O latency.



Integration Tests

Use `client_cache_service()` to simulate the API in-memory without network calls.



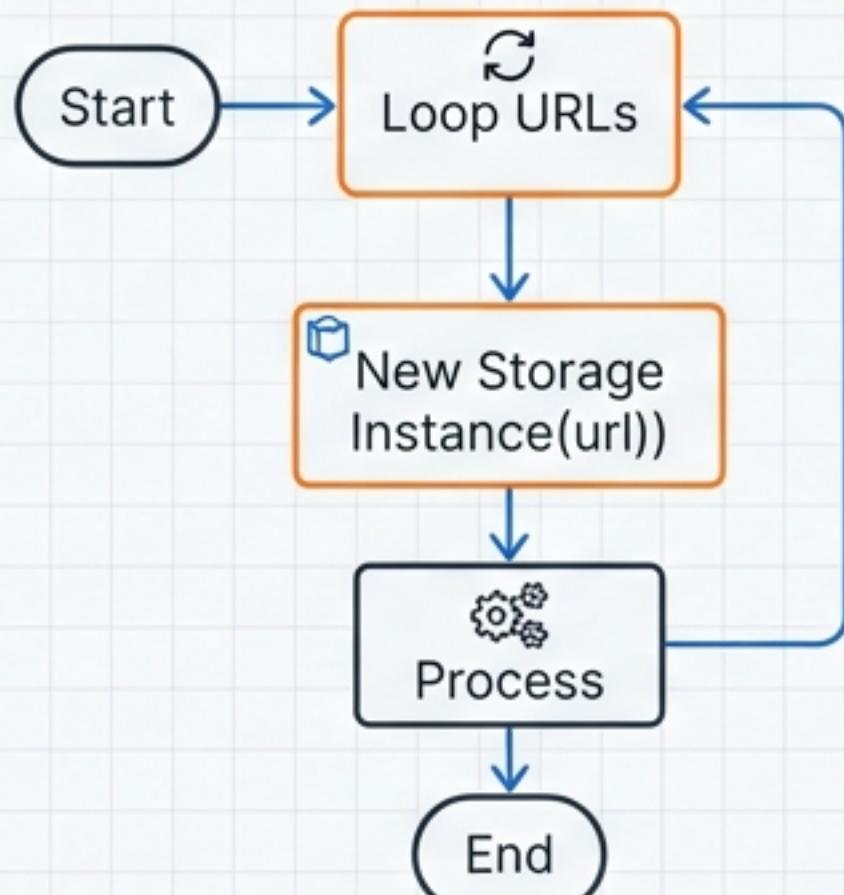
Isolation

Create a fresh storage instance for every test function to prevent state leakage.

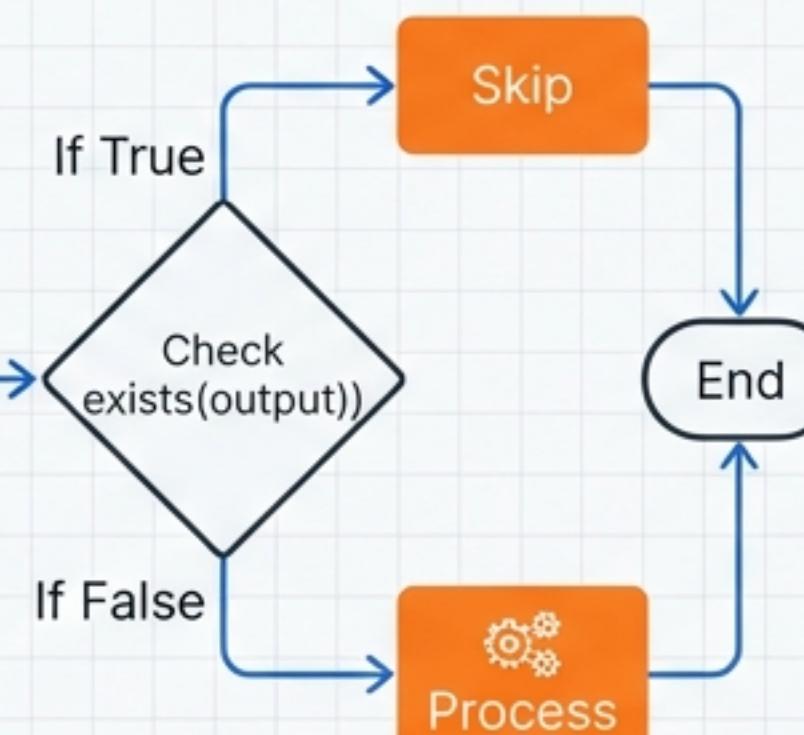
Common Workflows

Standard recipes for processing.

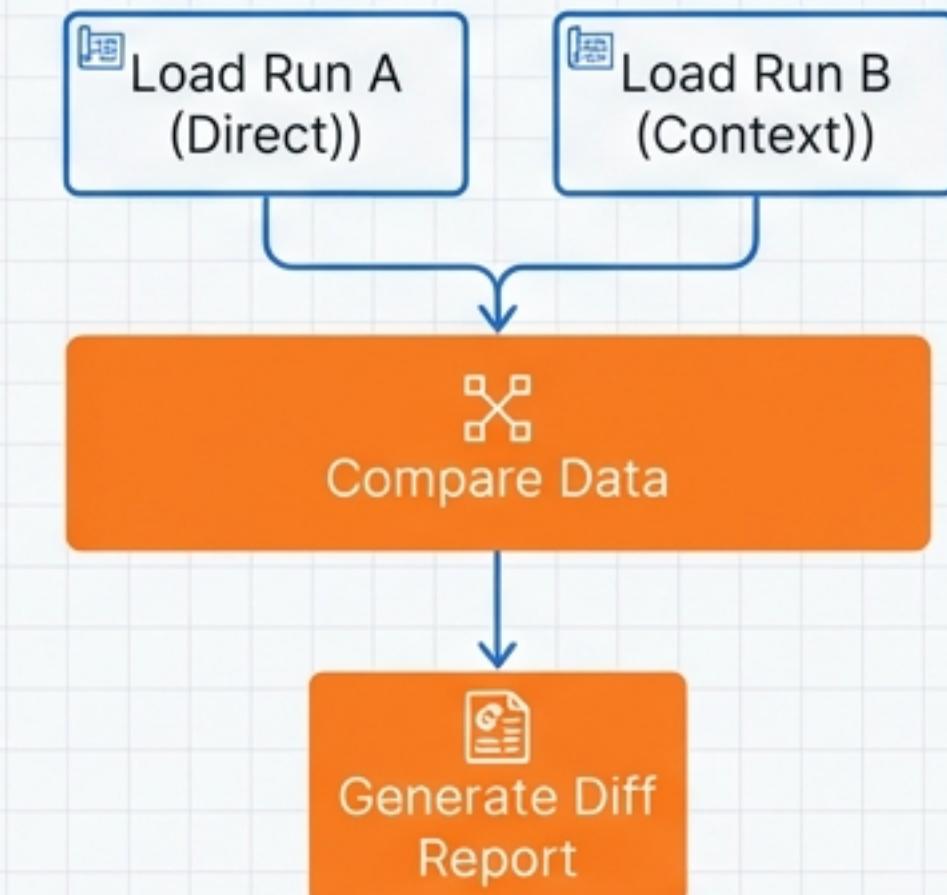
Batch Processing



Resume Processing



Before/After Diff

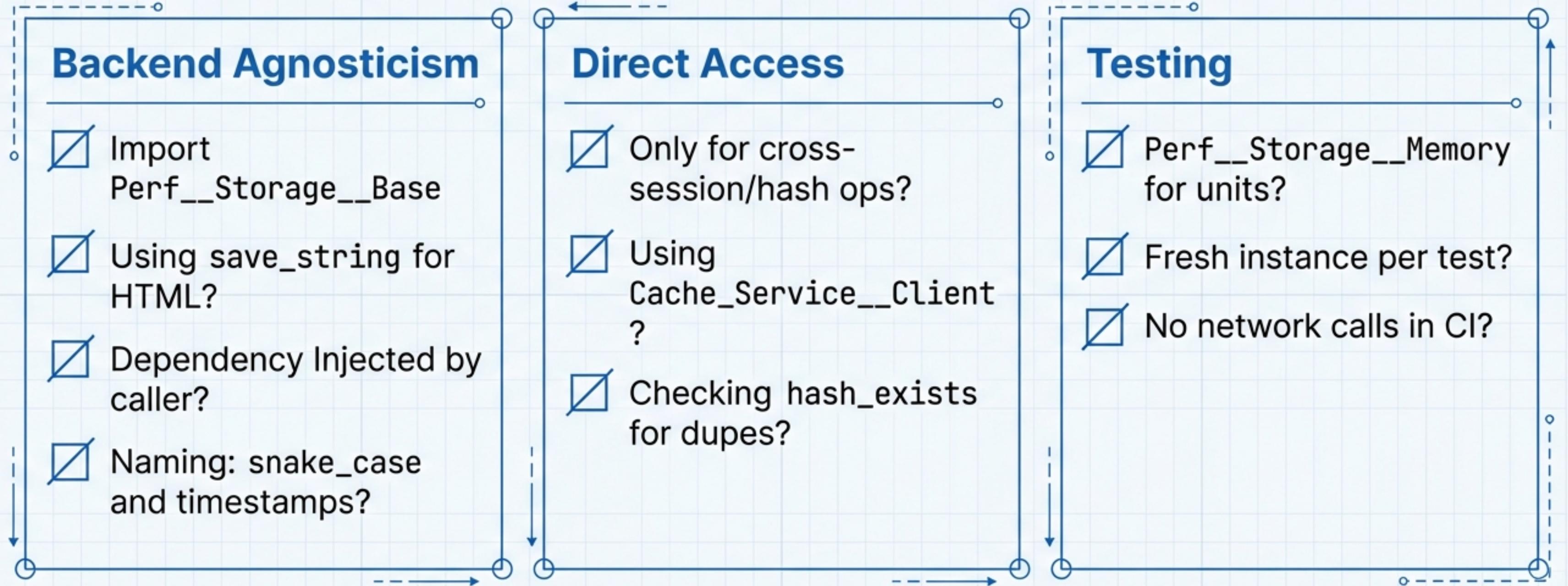


Known Known Limitations & Roadmap

Rough edges in the current iteration.

- **`list_keys()`**: Currently returns `[]` on Cache Service.
Workaround: Track keys externally or use admin API.
- **No Bulk Ops**: No native batch save/load yet.
Workaround: Loop over items individually.
- **No Streaming**: Large files must be loaded fully into memory.
Workaround: Ensure host has sufficient RAM.
- **Context Switching**: Session/Target are fixed at construction.
Workaround: Create new instances for new targets.

Summary & Developer Cheat Sheet



Documentation: [PHASE_E_3_llm_brief_storage_usage.md](#)