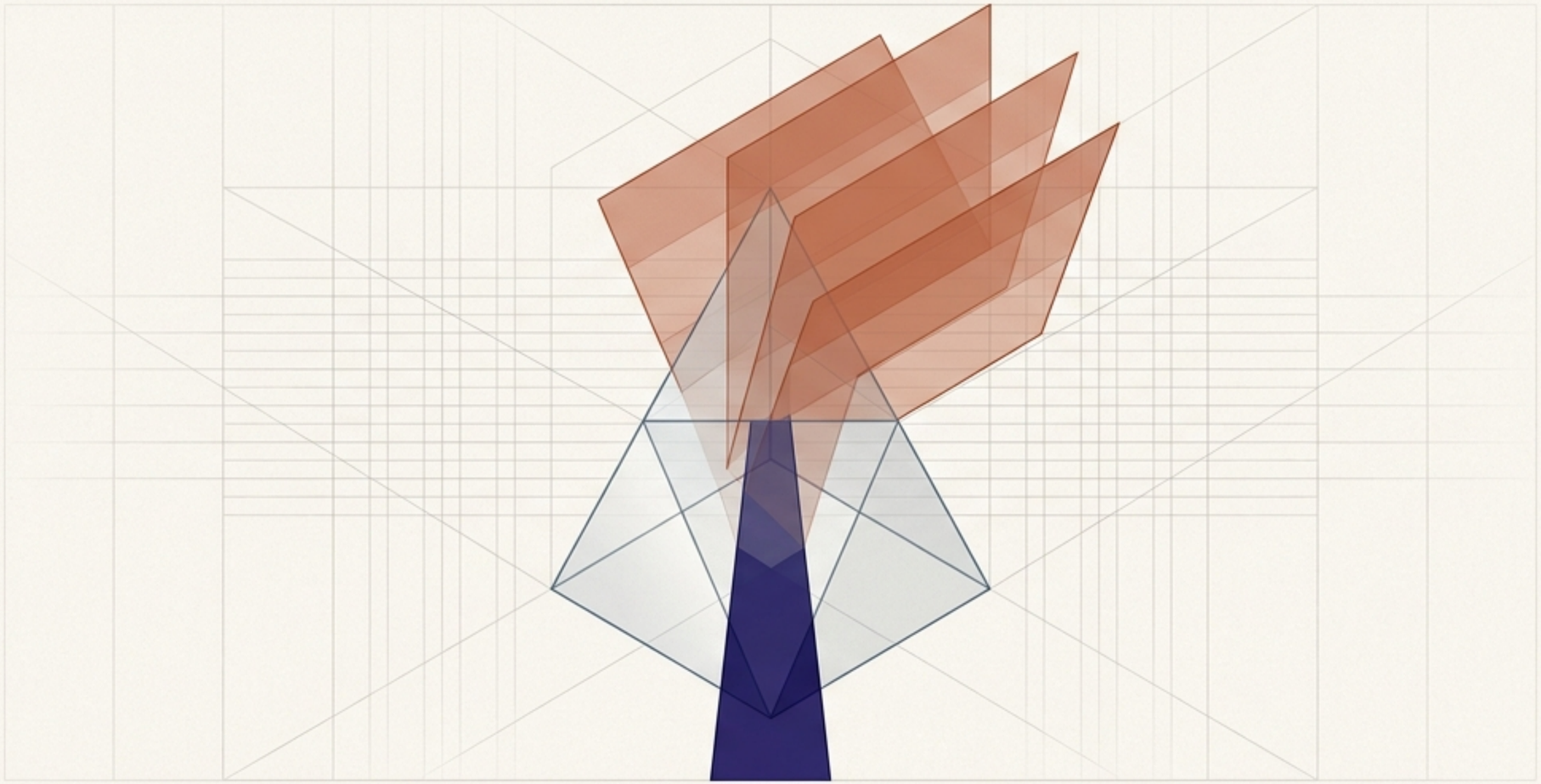


Refracting Knowledge

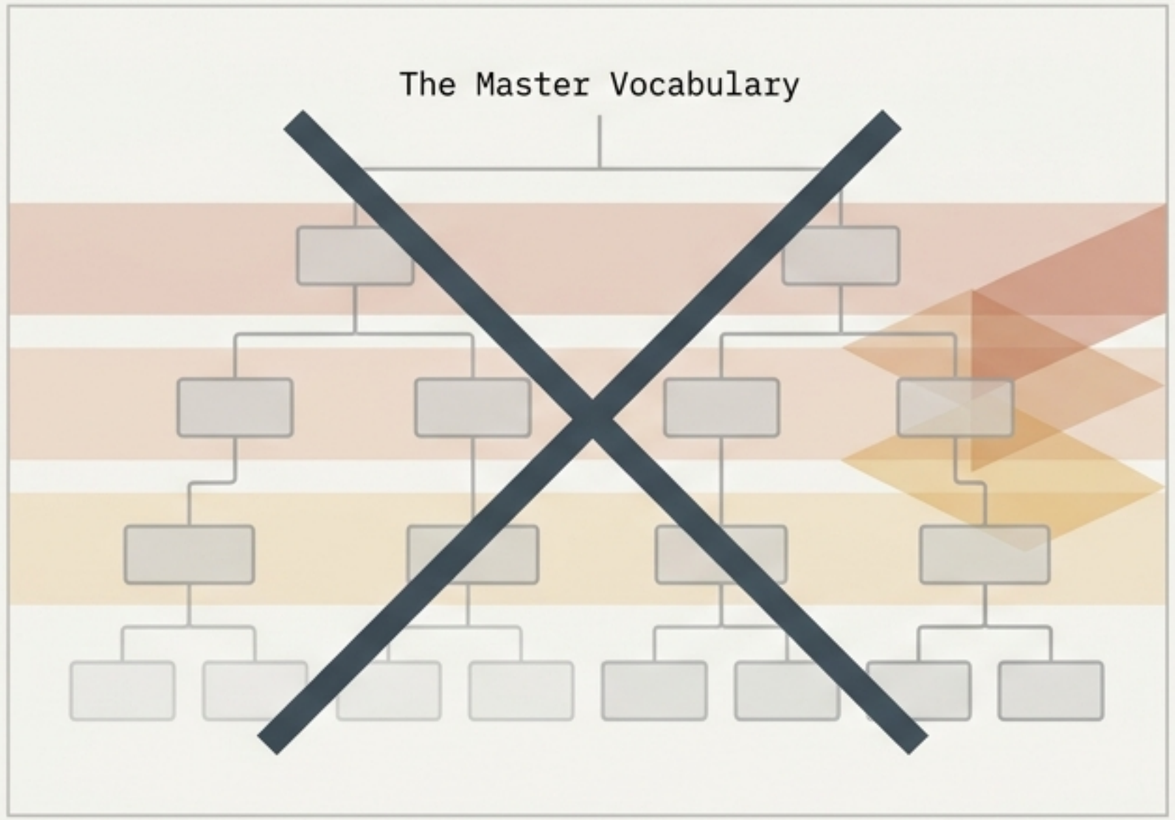
Two-Tier Governance and the Solution to Semantic Heterogeneity

A synthesis of The Akashic Atlas and Information Flow Theory

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The failure of the Master Vocabulary

The historical approach to semantic heterogeneity has been forcing a single universal taxonomy. This collapses under domain pressure.



When research groups disagree on classification, forcing a single ontology erases nuance rather than modeling it.

TARGET: Library of Congress Subject Headings (LCSH)

QUERY: Fantasy games

RESULT: 137 narrower terms

DIAGNOSIS: 136 individual game titles flattened into one parent.

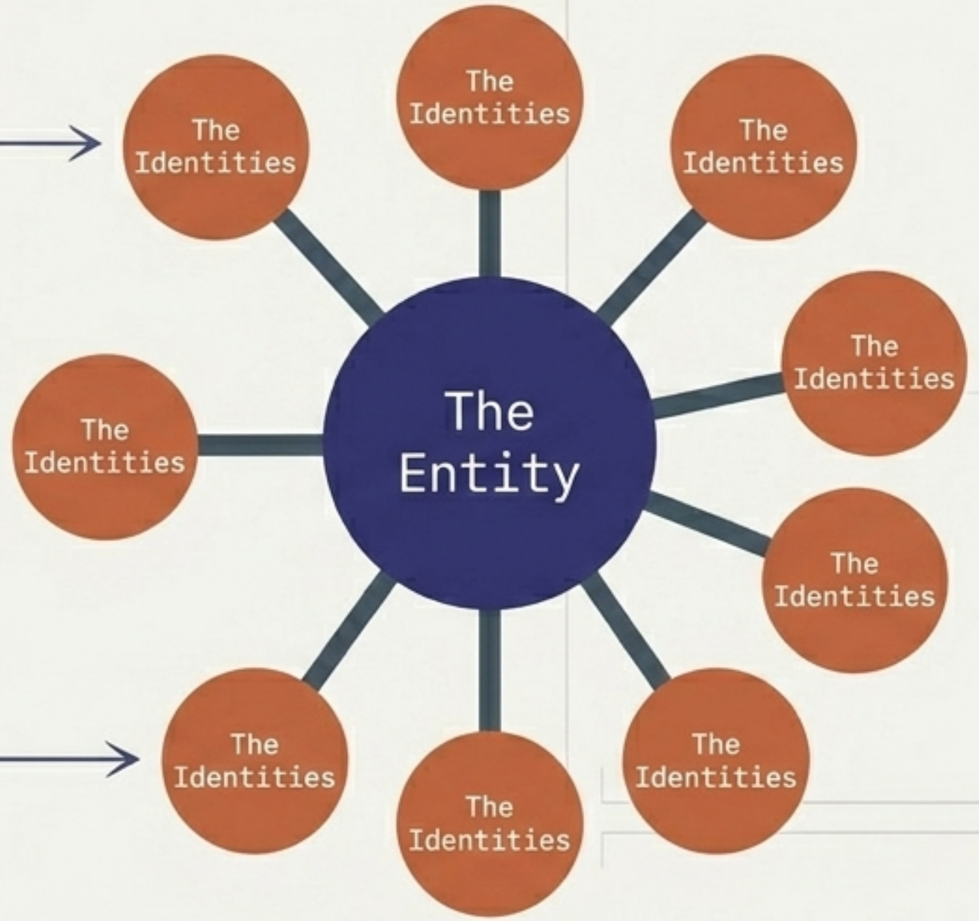
STATUS: Structural Failure. No consistent membership criterion.

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One thing is many things

Multi-cardinality is the default. Single-cardinality is a constraint applied per context, never pre-baked on the entity. Pretending that one thing is exactly one thing is a modeling failure. The architecture must refuse false choices.

A TTRPG `character` is simultaneously a fictional person, a player-character, and an archetype.



A `research paper` is a source, an output of a review, and a cited-by node.

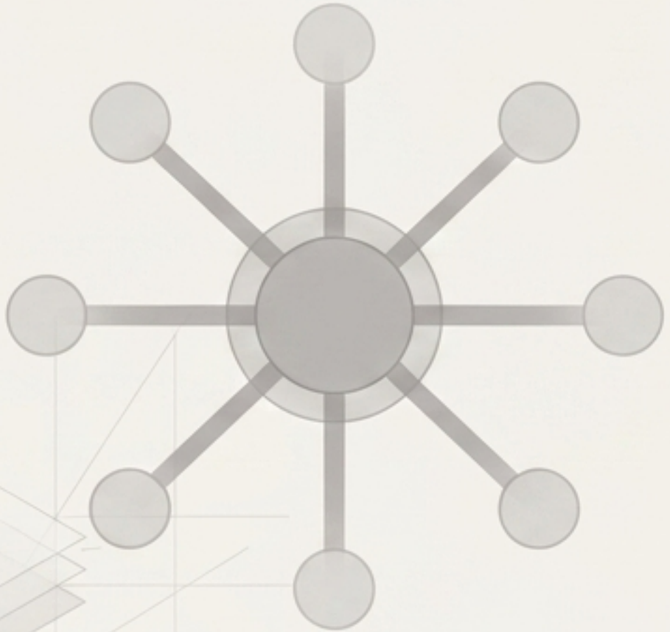
An ancient `bronze bell` is a musical instrument, a ritual object, and a chronological artifact.

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Transitioning from a Star to a Galaxy architecture

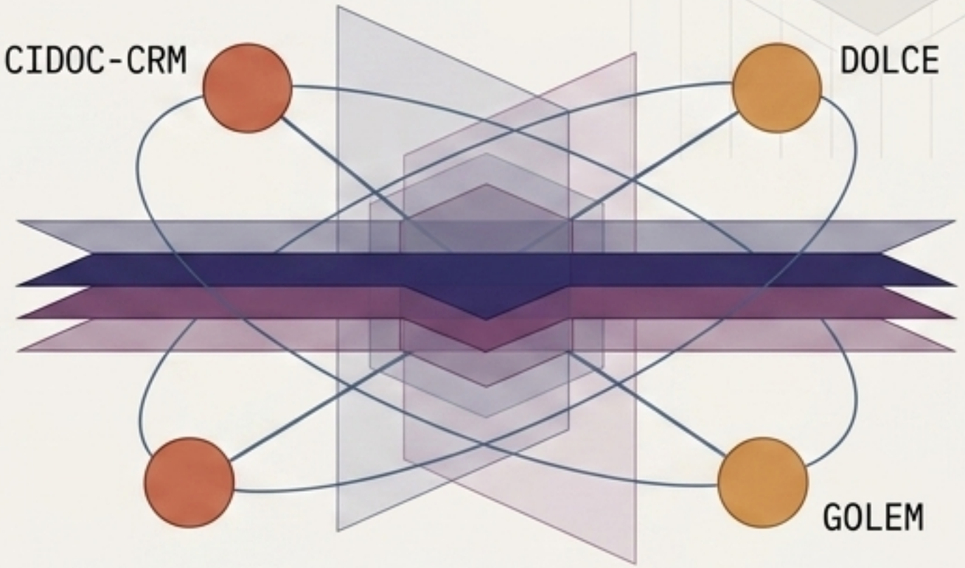
The job of modern architecture is translation, not imposition.

The Star



The Hub approach imposes a master vocabulary. Every external system must flatten its nuance to fit the privileged center.

The Galaxy



The Registry approach coordinates independent schemes. Systems translate between vocabularies that disagree, preserving native logic. There is no privileged center.

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The Two-Tier Governance architecture separates reality from reading

Tier 3 / Local Types	Per-group, per-author extensions, local classifications, and subjective schemes. akashic-7 Museum Usages
Tier 2 / The Bridge	Typed mapping properties, curated formal layers, Information Flow infomorphisms, and PROV-O chains.
Tier 1 / Base Tokens	Immutable IRIs, shared base instances, Wikipedia/Wikidata background gloss. https://w3id.org/akashic/vocab# Shared Artifact Tokens

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Case Study 1: The Akashic Atlas

A research instrument built to analyze the semiotics of tabletop role-playing games, where terms inhabit multiple stances at once. Two research groups can disagree on a classification, store both in the same database, and have each see their own default. Disagreement is preserved as data.

Tier 3 (Local)

Scope-bounded local sharpening. A local paper's classification does not pollute the global lexicon.

Tier 2 (Formal)

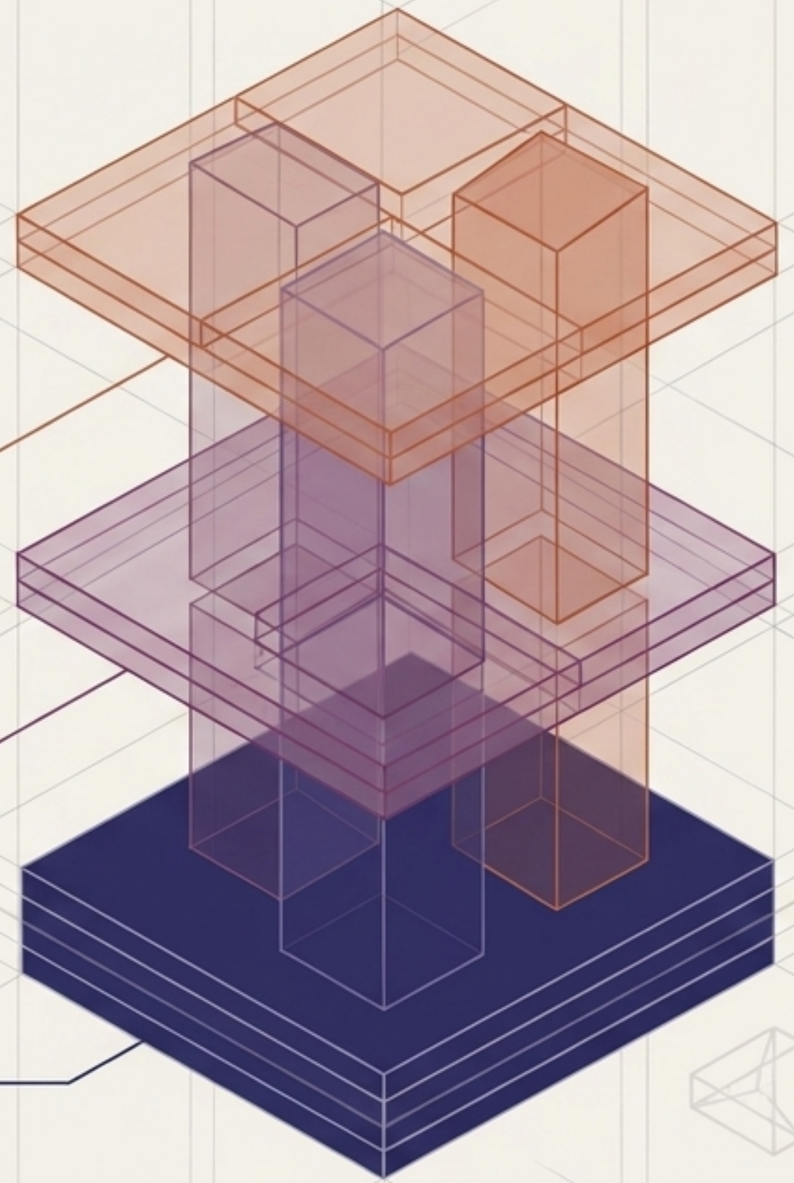
`DOLCE-Lite-Plus & akashic-core`

Curated anchors reasoning across vocabularies.

Tier 1 (Global)

`Wikipedia / Wikidata`

Always-on background gloss.



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Ontologies as Package Managers

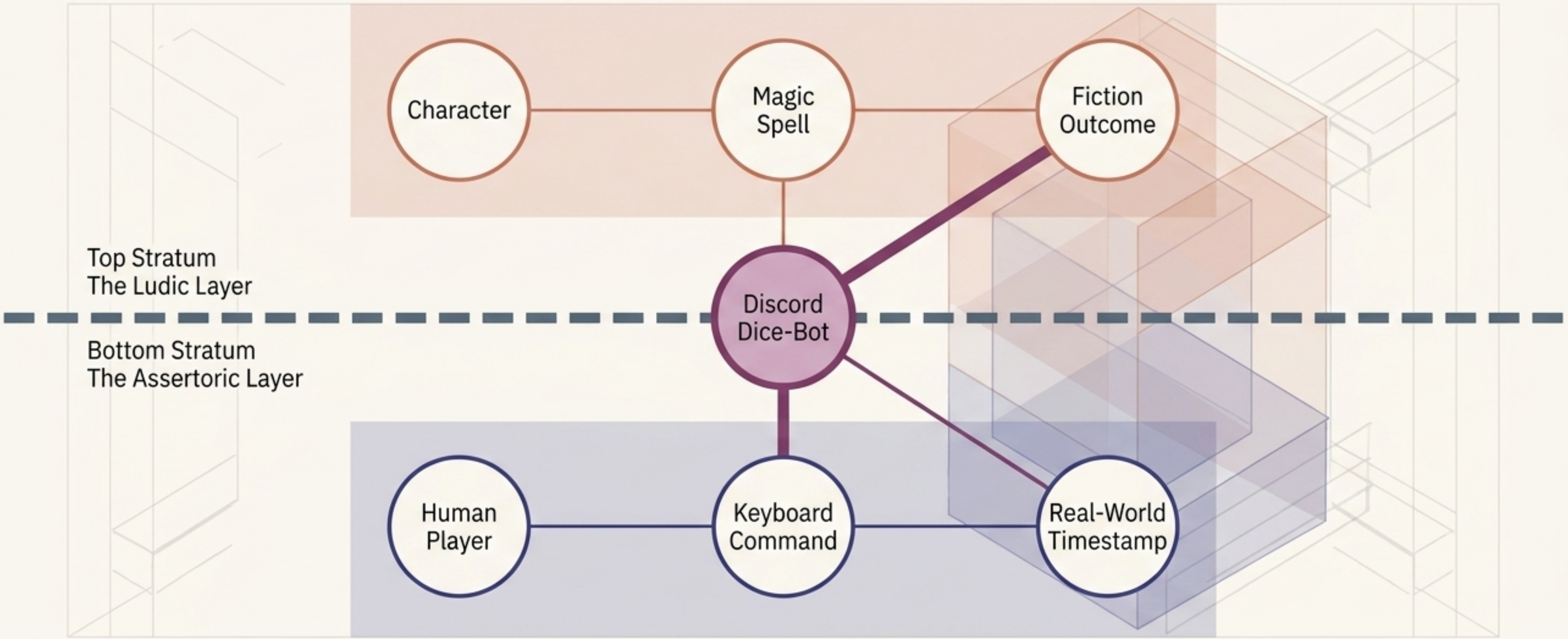
The registry-of-schemes shape borrows explicitly from package registries (npm, PyPI) to solve vocabulary extensibility. Curated defaults ship out-of-the-box, but a group can author its own scheme without asking permission, just as a developer writes a package.json.

NPM (Software)		SKOS (Ontology)
Package	↔	**skos:ConceptScheme**
package.json	↔	**Declared dependencies** (core_scheme_includes)
Publisher	↔	**Ownership Scope** (Platform, Group, Author, Paper)
Visibility (pub/crate)	↔	**export_visibility** (Auto, Published, Internal)
npm install	↔	**Use** (Run-time activation in reading context)

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Refusing false choices with Bridge Entities

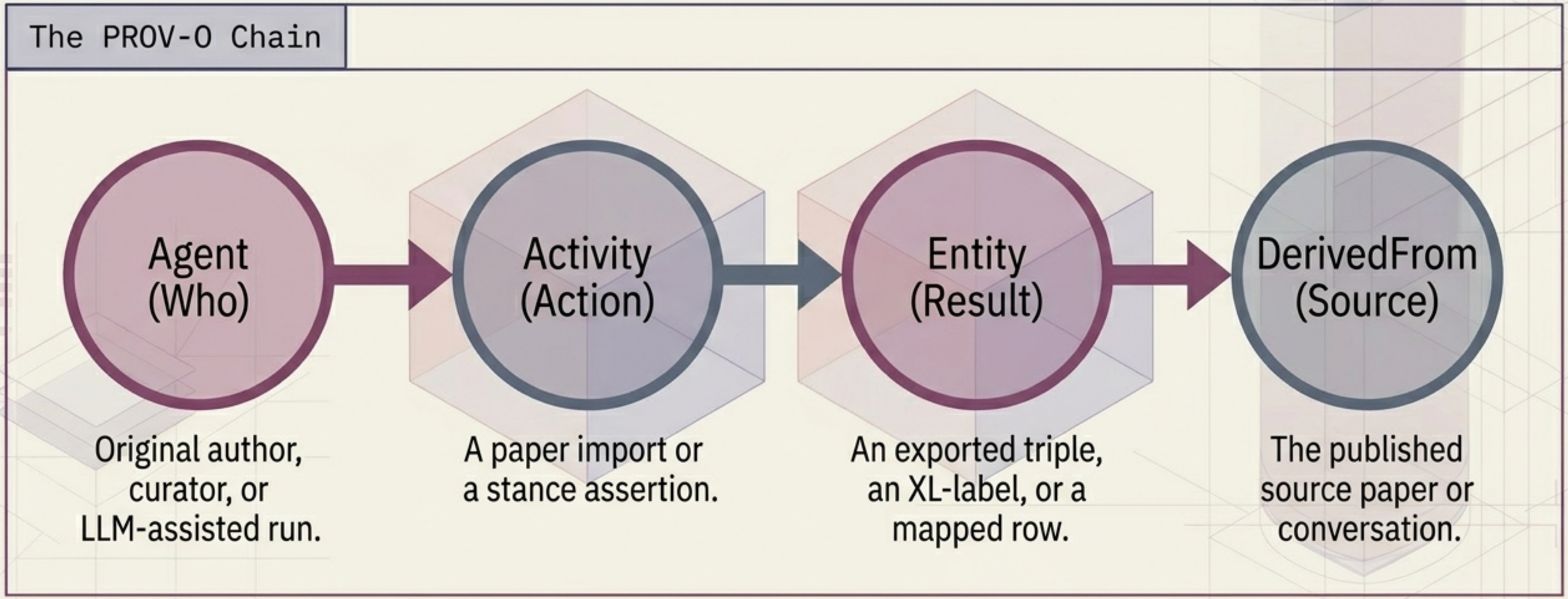
A Discord dice-bot accepts a real-world command to produce an in-fiction effect. It belongs fully to neither layer, and entirely to both. Modeled as a typed concept with explicit edges to both strata, it refuses the choice between just a tool and just a mechanic.



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Provenance as first-class data

In an amateur-knowledge domain, who said this is not metadata. It is data. When definitions diverge, the system maps the disagreement logically: **skos:exactMatch**, **closeMatch**, or typed disagreements (contradicts, redefines).



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Case Study 2: Distributed Digital Museums

The Chinese cultural heritage network contains vast, heterogeneous archives that cannot communicate. A conceptual mapping based on literal meaning fails because they use entirely different instance values.

Museum 1 (Temporal)

Bronze Ware Classification
(Creation Time)

Period
XiaShang
XiZhou
ChunQiuZhanGuo

Dynasty

SEMANTIC DISCONNECT



NON-INTEROPERABLE SCHEMA

Museum 2 (Functional)

Bronze Ware Classification
(Usage and Shape)

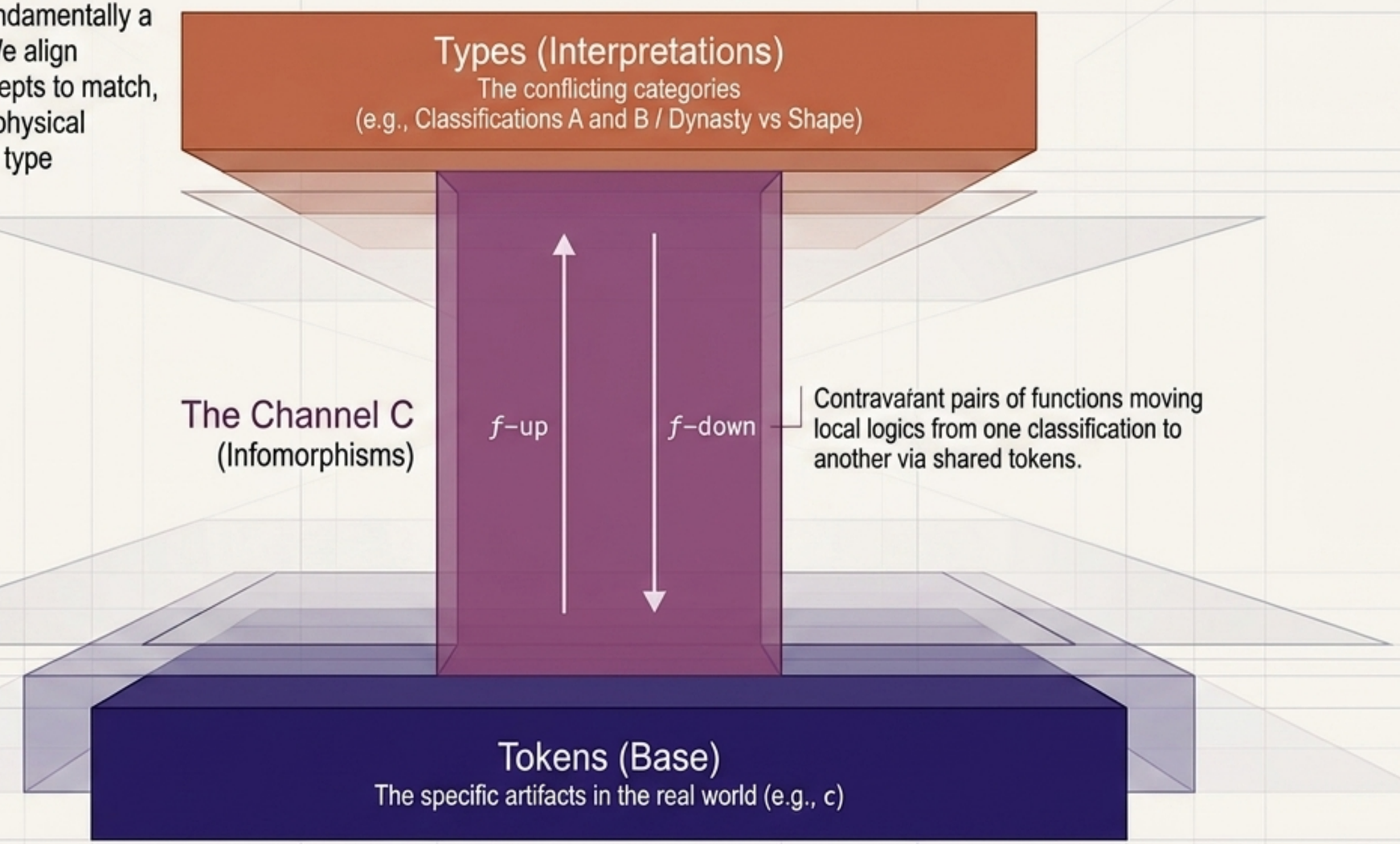
Category	Type
Cooking Ware	
Musical Instruments	Cymbals
	Bells
	Bo

Usage

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The Information Flow Channel

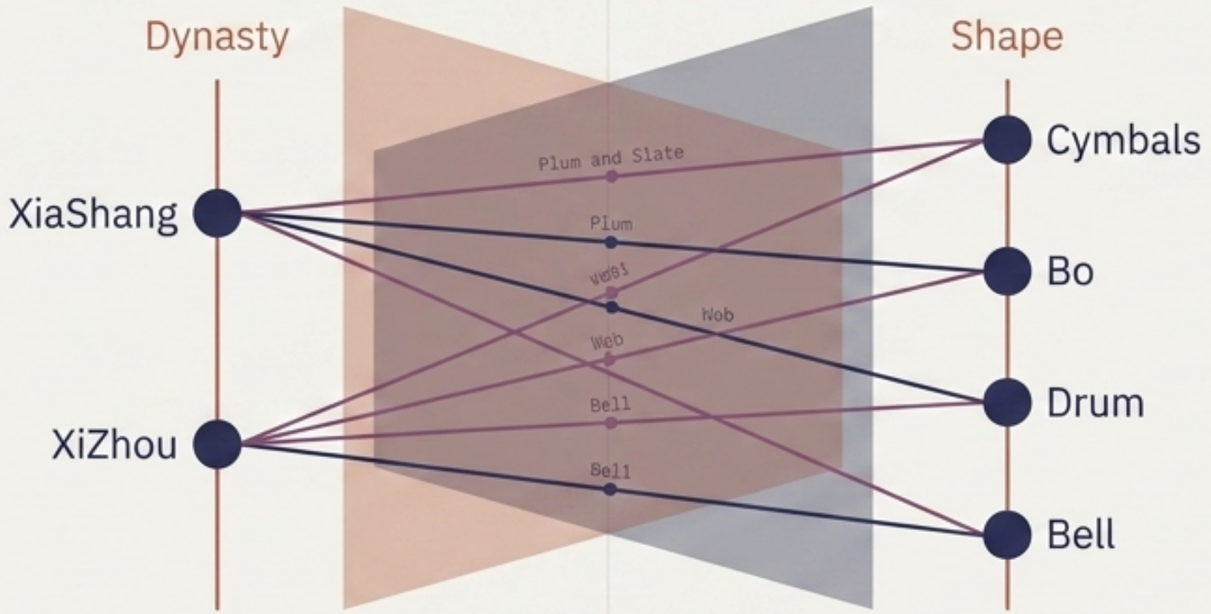
Takeaway:
Semantic interoperability is fundamentally a problem of information flow. We align ontologies not by forcing concepts to match, but by observing how shared physical tokens behave within different type hierarchies.



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The Bronze Ware translation matrix

Meaning coordination is achieved by classifying shared instances across both type systems. We can seamlessly query across museums because the underlying objects translate the human classifications.



The Matrix Connections:
- Tokens {t1i, s1i} map XiaShang (Dynasty) to Cymbals, Bo, Drum (Shape).
- Tokens {t2i, s2i} map XiZhou (Dynasty) to Cymbals, Bell, Bo (Shape).

Generated Constraints:
XiaShang ├ Cymbals, Bo, Drum

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The Two-Tier Architecture Comparison

Parallel solutions to semantic heterogeneity.

	Akashic Atlas	Digital Museums
The Base Layer	Immutable IRIs & core_strata	Shared Instances / Tokens
The Interpretation Layer	skos:ConceptScheme	Classification Types
The Translation Mechanism	Typed Mapping Properties (exactMatch)	Information Flow Infomorphisms
The Core Philosophy	One thing is many things	Meaning coordination via shared instances
Extensibility	Package-manager registry	Peer-to-peer query network

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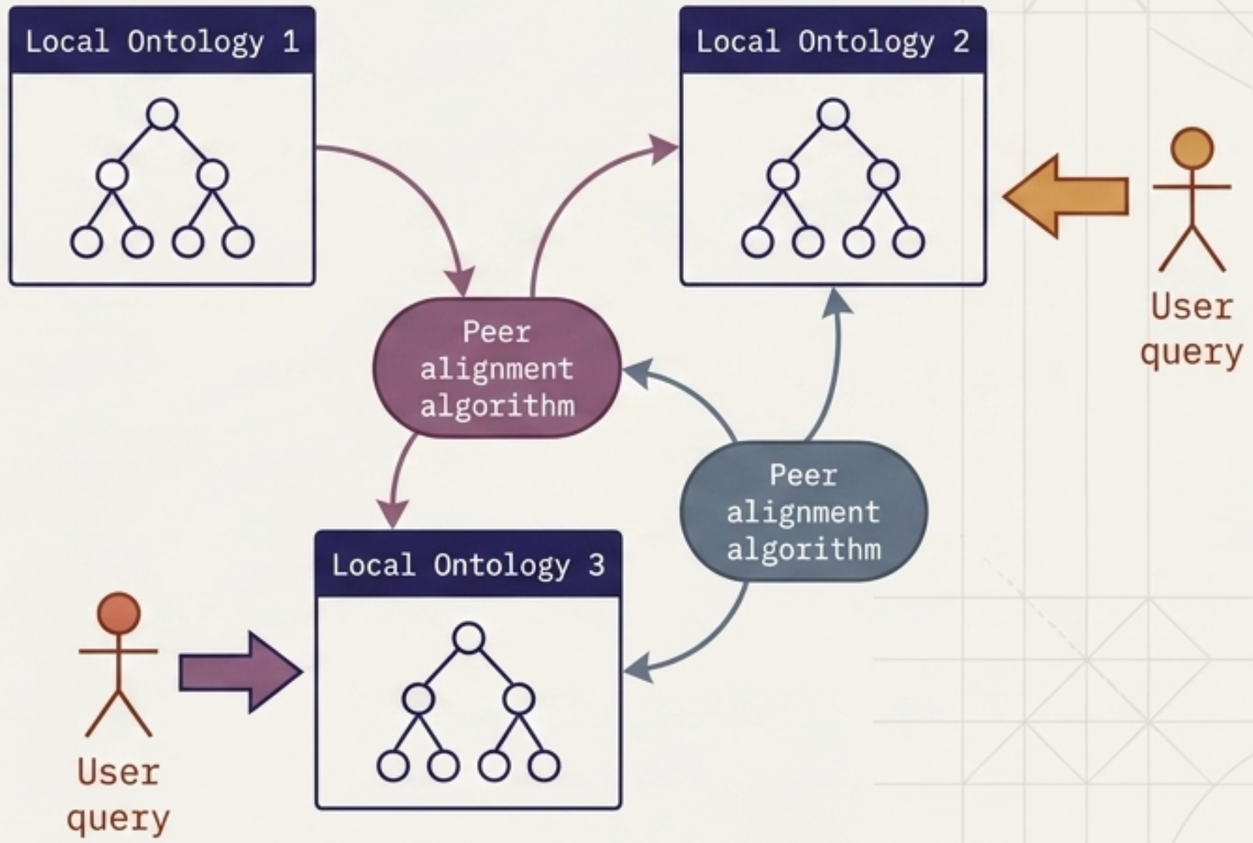
Peer-to-peer meaning coordination

In decentralized architectures, queries traverse local ontologies via calculated association strengths or dependency resolvers. Answers include local instances and foreign instances obtained via automated, mathematical mappings.

Mechanism:

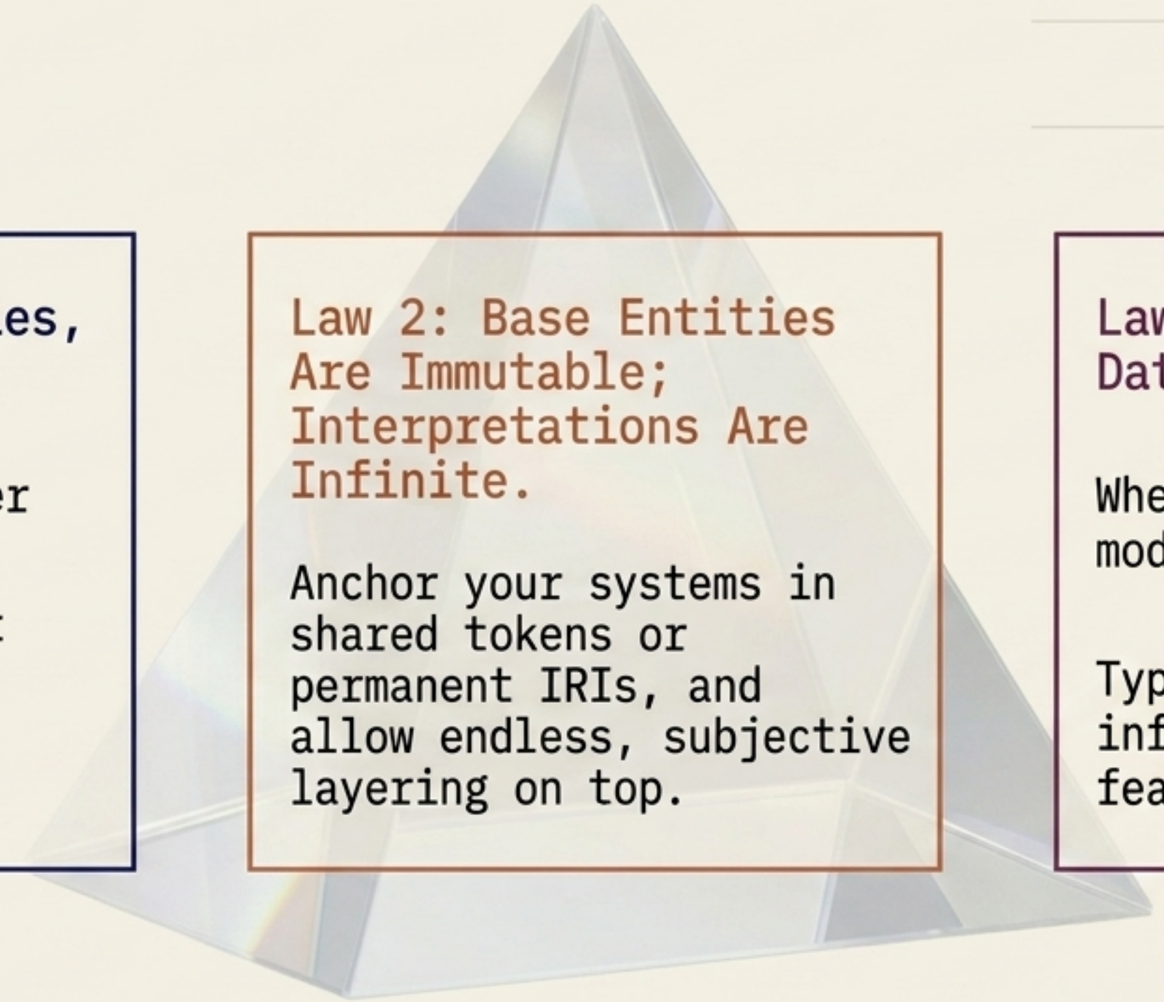
Akashic: A dependency resolver walks the scope ladder from most-local (paper scheme) outward to fallback (curated platform defaults).

Museums: P2P queries map instances based on Association Strength (AS). Adjusting threshold values dynamically controls the Precision/Recall tradeoff.



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The governing rules of decentralized knowledge



Law 1: Build Galaxies, Not Stars.

Do not impose a master vocabulary.

Build registries that coordinate distinct, specialized schemes.

Law 2: Base Entities Are Immutable; Interpretations Are Infinite.

Anchor your systems in shared tokens or permanent IRIs, and allow endless, subjective layering on top.

Law 3: Disagreement is Data.

When definitions diverge, model the divergence.

Typed disagreements and infomorphisms are features, not bugs.

Two-tier governance is the foundation of the semantic future.

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