

2.5.1 Semantic Drift over Time

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Reporting requirements, definitions, and interpretive guidance evolve in response to regulatory change, policy refinement, emerging analytical needs, and changes in institutional practice. Without an explicit architectural framework that separates [semantic](#) representation, rule-based interpretation, and versioned interpretive context, systems cannot manage such change systematically.

As a result, reporting systems are vulnerable to **semantic drift**: the gradual divergence in how ostensibly similar data elements are interpreted across reporting periods, agencies, jurisdictions, or independently developed systems.

Semantic drift may occur even when syntactic standards, schemas, taxonomies, or message structures remain unchanged. Changes in definitions, assumptions, classifications, parameters, or rules may be embedded in code, configuration, guidance, or analytical procedures without explicit linkage to prior semantic baselines.

Without architectural support for versioned semantics, traceability of interpretive context, and controlled evolution of meaning, systems cannot determine reliably:

- Which definition applied at a particular time
- Which rules and assumptions governed an interpretation
- How a historical result relates to a current definition
- Whether a change resulted from revised data, revised rules, or revised meaning
- Whether two apparently comparable results share the same semantic basis

Over time, this condition erodes historical comparability, auditability, and reproducibility. It weakens the ability to explain trends, reassess prior conclusions, compare results across reporting periods, or defend analytical outcomes, even when the underlying data remains syntactically valid.

Semantic drift is therefore not merely a data-quality issue or a tooling deficiency. It is an architectural failure mode that arises when systems leave meaning implicit, distribute it across components and organisations, and fail to govern it across boundaries and over time.

Addressing semantic drift requires architectural mechanisms that make semantic change:

- Explicit
- Identifiable
- Versioned
- Traceable
- Comparable
- Governable
- Reconstructable throughout the reporting lifecycle

The [Federated Data Interpretation Systems Reference Architecture \(FDIS-RA\)](#) addresses this failure mode by separating semantic assets, interpretive rules, version context, and execution responsibilities and by preserving their relationships across reporting periods and system boundaries.

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