6. Data Mapping and Schema

6.1 The Challenge of Data Alignment

The FIRS MBS platform enforces strict validation on invoice payloads. Every header, line item, tax code, and reference must align precisely with regulator specifications. Enterprises often face mismatches: ERP fields named differently, optional fields in ERP that are mandatory for FIRS, or tax code libraries that don't align with regulator codes.

Failure to map correctly results in rejected invoices, delayed collections, and compliance risk.

6.2 Our Canonical Data Model

To solve this, Softrust and Bluelight enforce a **canonical schema** within <BluelightSmartAPI>. This schema is stable, versioned, and designed to remain constant even as FIRS updates its rules.

Canonical Model Features

- **Header Section** – document ID, invoice number, supplier TIN, buyer TIN, company code, issue date, plant, currency, totals.
- **Line Items** – line number, description, quantity, unit price, tax code, line amount.
- **Taxation** – VAT, zero-rated, exempt codes, mapped consistently to regulator taxonomy.
- **References** – order numbers, delivery notes, customer IDs.
- **Metadata** – source system identifier, correlation ID, IDoc number or API request ID.

<diagram: Canonical schema model showing ERP field → canonical JSON → FIRS schema mapping>

6.3 Mapping from ERP and Billing Systems

SAP ECC

- IDoc INVOIC02 segments (E1EDK01, E1EDK14, E1EDP01, etc.) mapped to canonical fields.
- TIN captured from master data and validated against regulator database.
- Tax codes mapped using SAP condition records to FIRS equivalents.

SAP S4/HANA

- API_BILLINGDOCUMENT_SRV entities mapped directly.

- Company codes and plants resolved into canonical invoice header.
- Customer master and product master cross-mapped to regulator TIN and HS code libraries.

Other ERPs

- Oracle EBS XML nodes, Dynamics OData entities, and CSV exports handled by mapping templates.
- Legacy systems handled through BlueBox capture with rules-based parsing.

6.4 Mapping to FIRS MBS Schema

<BluelightSmartAPI> transforms the canonical JSON to FIRS-required schema in real time.

Key Features

- **Mandatory field enforcement** – missing buyer TIN or invoice date rejected at SmartAPI layer before reaching FIRS.
- **Normalization** – formats normalized (e.g., dates converted to ISO 8601).
- **Validation rules** – numeric fields validated, tax codes checked, HS codes cross-referenced.
- **Error messages** – structured error returned to ERP or Email Connector with root cause for correction.

6.5 Resource Library and Reference Data

Compliance requires external data sources beyond invoices. Our system includes a **reference data library**:

- **HS Code Library** – product mapping to correct HS classification.
- **Customer Master** – client-provided mapping of customer IDs to TINs and regulator IDs.
- **Tax Code Library** – mapping of ERP tax codes to regulator codes.
- **Service Codes** – library maintained and updated centrally, synced with FIRS resources.

This ensures Finance and Compliance teams do not waste time remapping master data repeatedly.

<diagram: Reference library architecture – master data from client + regulator codes → SmartAPI cache → invoice mapping>

6.6 Version Management and Change Absorption

FIRS regularly updates schema specifications. Most vendors pass these changes back to the client ERP, causing expensive rework. Our model avoids this:

- **Versioned Schemas** – SmartAPI maintains multiple schema versions in parallel.
- **Feature Flags** – changes can be enabled or disabled without disrupting ERP integration.
- **Backward Compatibility** – client ERP continues submitting in canonical schema, even as SmartAPI adapts to new FIRS rules.
- **Hotfix Pipeline** – regulatory changes implemented in SmartAPI and deployed rapidly, without ERP modification.

6.7 Error Handling and Guided Correction

- Validation rejects returned in structured JSON or as email notifications.
- Errors logged with correlation IDs for quick traceability.
- Finance users guided with reason codes (e.g., “Invalid TIN format,” “HS code mismatch”).
- Corrected invoices automatically resubmitted through the same pipeline.

6.8 Why This Matters

By insulating client ERPs from schema churn and automating mapping through libraries and canonical modeling, Softrust and Bluelight deliver:

- **Fewer rejections** and faster clearance.
- **Reduced IT workload** during regulatory changes.
- **Continuous compliance** without costly ERP customization.
- **Confidence for Finance and Compliance** that tax codes, HS codes, and TINs are always correctly aligned.