# Integration Contracts & Service Level Agreements (SLAs)

## Purpose & Scope

This document defines the interfaces, responsibilities and service‑level obligations for integrating the ERP/IMS platform with external systems. The goal is to ensure seamless data exchange and reliable operations across the following integrations:

* **Web Store (E‑Commerce storefront and point‑of‑sale)** – synchronization of catalog, orders and payments.
* **Third‑Party Logistics (3PL) provider** – outbound fulfillment, inbound receiving and inventory updates.
* **Accounting system** – posting journal entries, accounts receivable/payable and financial reporting.
* **Sales Tax service** – real‑time tax calculation and transaction reporting.

Each section documents the interface protocols (REST APIs, message events, EDI), data formats, security requirements and the service‑level targets that each party must meet. The agreements align with the non‑functional requirements for performance, availability and security and draw upon industry benchmarks and external SLAs (e.g., API2Cart guarantees 99.8 % monthly uptime【2908403305847†L120-L135】, TaxJar advertises 99.99 % uptime and sub‑20 ms response times【118742738972405†L9-L20】, and 3PL providers commit to same‑day or next‑day shipping with >98 % accuracy【570632324258247†L60-L119】).

## General Requirements

1. **Communication Patterns** – Synchronous requests use RESTful APIs with JSON payloads. Event‑driven interactions use Azure Service Bus topics/queues, following the message contracts defined in the event schema document. All messages include a standard envelope with eventId, timestamp and correlation IDs.
2. **Authentication and Authorization** – All API calls require OAuth 2.0 access tokens; event consumers must authenticate using managed identities. Role‑based access control ensures callers may only perform permitted actions.
3. **Data Format and Versioning** – JSON is the default format with explicit property names. Schema versions use semantic versioning (v1, v2) in the URL or message subject. Breaking changes require a new version.
4. **Transport Security** – HTTPS/TLS 1.2+ is mandatory for all HTTP endpoints. Messages on the Service Bus use Transport Layer Security. Sensitive fields (payment tokens, PII) must be encrypted at rest.
5. **Monitoring and Alerts** – Each integration exposes metrics (uptime, latency, error rates) to Azure Monitor. Alerts trigger when thresholds are breached. Monthly scorecards are shared with stakeholders.
6. **Change Management** – Changes to integrations (new endpoints, message schema changes) require at least 30 days’ notice and parallel support for both old and new versions for 90 days.
7. **Disaster Recovery** – All external connections must be designed for redundancy. The ERP/IMS will retry transient failures using exponential backoff. Persistent failures trigger manual intervention according to escalation procedures.

## Integration 1 – Web Store (E‑Commerce & POS)

### Scope

* Real‑time product catalogue synchronization (SKUs, bundles, pricing, hazardous attributes, images).
* Order placement from the web store and in‑store POS, including support for promotions and contract pricing.
* Payment authorization, fraud screening, settlement and refunds.
* Inventory visibility (available‑to‑promise) and reservation on checkout.
* Customer account creation and updates.

### Interfaces and Protocols

| Interaction | Direction | API/Channel | Payload | Notes |
| --- | --- | --- | --- | --- |
| **Product Sync (full & delta)** | ERP → Web store | REST GET /api/v1/products + change events | Paginated product list with catalogue attributes, units, bundle compositions, hazard codes. | Full export nightly; delta updates pushed via ProductUpdated events. |
| **Order Placement** | Web store → ERP | REST POST /api/v1/orders | Order header (customer info, shipping & billing address), line items, payment method, gift messages, coupons. | Must be idempotent (duplicate clientOrderId ignored). |
| **Payment & Fraud** | Web store ↔ ERP/Payment Gateway | REST POST /api/v1/payments and POST /api/v1/fraud-check | Payment token, amount, currency, tax, shipping; fraud screening request. | ERP returns authorized/declined status and risk score. |
| **Inventory Availability** | ERP → Web store | REST GET /api/v1/inventory/{productId} | Available, reserved and on‑order quantities per warehouse/fulfilment node. | Exposed to storefront to prevent overselling. |
| **Order Status Updates** | ERP → Web store | Service Bus OrderStatusChanged events | Status transitions (pending, processing, shipped, cancelled, return received). | Used to notify customers via email/SMS. |

### Service Level Targets

* **Uptime** – The API endpoints consumed by the web store must be available **≥ 99.9 %** of the time. A 99.9 % uptime allows approximately 1 min 26 s of downtime per day【685537784816955†L81-L86】. Downtime beyond this threshold will result in service credits proportional to the outage duration.
* **Latency** – For 95 % of calls, API response time must be **≤ 2 seconds**; 99 % of calls must complete within **5 seconds**. Catalog delta events must be published within **15 minutes** of changes.
* **Throughput** – The ERP must handle bursts of at least **10 orders per second** and **1 000 catalogue updates per minute** during promotions.
* **Data Accuracy** – Product and pricing data must be **100 % accurate**; orders must not be lost or duplicated.
* **Security** – All requests must be authenticated; failed authentications result in HTTP 401. Payment tokens are never persisted in plain text.
* **Support** – P1 incidents (integration unavailable) require acknowledgement within **15 minutes** and resolution or workaround within **2 hours**.

### Responsibilities & Obligations

| Party | Obligations |
| --- | --- |
| **ERP/IMS** | Expose stable, well‑documented APIs; publish product and inventory events promptly; provide sandbox environment; ensure idempotency; maintain comprehensive logging and trace IDs. |
| **Web Store** | Use provided APIs responsibly; respect rate limits; handle error responses gracefully and retry idempotently; provide accurate customer and payment data; secure API credentials; notify ERP of planned maintenance that might increase call volume. |

## Integration 2 – Third‑Party Logistics (3PL) Provider

### Scope

* **Outbound fulfilment:** Sending pick lists and shipping instructions for orders, including hazmat documentation and carrier rate shopping.
* **Inbound receiving:** Notification of incoming purchase orders (ASN), receiving details and put‑away confirmations.
* **Inventory updates:** Real‑time updates to on‑hand quantities, damaged/returned goods and cycle count results.
* **Returns (RMA):** Handling returns authorisations, receiving returned items, and recording disposition (restock, refurbish, scrap)【91221083353783†L32-L33】.

### Interfaces and Protocols

| Interaction | Direction | API/Channel | Payload | Notes |
| --- | --- | --- | --- | --- |
| **Pick/Ship Instruction** | ERP → 3PL | REST POST /api/v1/fulfilment/orders | Order reference, warehouse location, pick list, carrier service preference, hazmat flags. | Generated automatically when orders reach “ready to ship” status. |
| **Shipping Confirmation** | 3PL → ERP | REST POST /api/v1/fulfilment/shipments | Shipment ID, tracking number, carrier, service level, packages, weights, shipping cost, hazardous materials documentation. | Must be sent within **30 minutes** of shipping. Trigger OrderStatusChanged event to update web store. |
| **Inbound ASN** | ERP → 3PL | REST POST /api/v1/receiving/advance-shipment-notice | PO number, vendor, expected delivery date, cartons/pallets and item quantities. | Enables the 3PL to plan receiving resources. |
| **Receiving Confirmation** | 3PL → ERP | REST POST /api/v1/receiving/receipts | PO number, received quantities, discrepancies, damages, lot/expiry details. | Must be sent within **48 hours** of receipt【570632324258247†L60-L119】. |
| **Inventory Adjustment** | 3PL → ERP | Service Bus InventoryAdjusted events | SKU, lot/serial, adjustment quantity (+/−), reason (cycle count, damage, shrinkage). | Supports real‑time inventory accuracy. |
| **Return Receipt** | 3PL → ERP | Service Bus ReturnReceived events | RMA number, items returned, condition, disposition (restock/refurbish/scrap). | Updates ERP and triggers refund or replacement. |

### Service Level Targets

* **Order Fulfilment Speed** – For direct‑to‑consumer orders received by **12 PM local warehouse time**, the 3PL must ship **≥ 98 %** of orders the same day【570632324258247†L60-L119】. Large LTL orders must ship **≥ 95 %** within **3 business days**【570632324258247†L60-L119】. The ERP will transmit orders by 12 PM or earlier.
* **Inbound Processing** – The 3PL must process **≥ 95 %** of inbound shipments and ASN receipts within **2 business days**【570632324258247†L60-L119】.
* **Order Accuracy** – Pick/pack accuracy must be **≥ 99 %**, meaning the correct items and quantities are shipped【570632324258247†L60-L119】.
* **Inventory Accuracy** – Cycle counts and inventory adjustments should maintain **≥ 98 %** on‑hand accuracy. Discrepancies over 2 % require root cause analysis.
* **Uptime** – Fulfilment APIs and EDI endpoints must be available **≥ 99.8 %** of the time, matching typical logistics SLAs.
* **Latency** – Shipping confirmations and inventory adjustments must be sent within **30 minutes** of the physical event; inbound receipts within **48 hours**.
* **Security & Compliance** – The 3PL must comply with hazardous‑materials shipping regulations; data must be exchanged via TLS and sensitive documents (e.g., hazmat declarations) encrypted at rest.
* **Penalties & Credits** – Failure to meet fulfilment speed or accuracy metrics for a calendar month may trigger service credits or cost reductions.

### Responsibilities & Obligations

| Party | Obligations |
| --- | --- |
| **ERP/IMS** | Provide complete and accurate order and ASN data; perform rate shopping; provide shipping labels and customs/hazmat documents; reconcile inventory adjustments; pay freight invoices timely. |
| **3PL Provider** | Pick, pack and ship orders according to SLA; process inbound shipments and returns promptly; provide accurate data; maintain facility security and regulatory compliance; communicate outages or delays. |

## Integration 3 – Accounting System

### Scope

* Posting financial transactions from sales orders, purchase orders, inventory adjustments and returns into the general ledger.
* Creating customer invoices and vendor bills; updating accounts receivable and accounts payable balances.
* Reconciling payments and refunds; generating journal entries for inventory cost of goods sold (COGS) and tax liabilities.
* Synchronising customer and vendor master data.

### Interfaces and Protocols

| Interaction | Direction | API/Channel | Payload | Notes |
| --- | --- | --- | --- | --- |
| **Journal Entry Posting** | ERP → Accounting | REST POST /api/v1/journal-entries | Debit/credit lines, amounts, GL accounts, memo, transaction date, source document reference. | Batch posting supported; must be idempotent. |
| **Invoice/Bill Creation** | ERP → Accounting | REST POST /api/v1/invoices / POST /api/v1/bills | Customer/vendor details, due date, line items, taxes, shipping, discounts. | Invoices are posted when orders are shipped; bills posted when receipts are confirmed. |
| **Payment Application** | Accounting → ERP | REST POST /api/v1/payments | Payment ID, invoice/bill numbers, amounts, payment method, dates. | Updates AR/AP status in ERP. |
| **Master Data Sync** | Bidirectional | REST GET /api/v1/customers / vendors | Customer/vendor names, addresses, tax IDs, payment terms. | ERP is the master for operational data; accounting may enrich with credit limits. |
| **GL Account Query** | ERP → Accounting | REST GET /api/v1/accounts | Chart of accounts structure, balances. | Used for validation and reporting. |

### Service Level Targets

* **Uptime** – Accounting APIs must be available **≥ 99.9 %**, aligning with typical SaaS accounting SLAs (allowing about 1 min 26 s downtime per day【685537784816955†L81-L86】).
* **Latency** – Journal entry, invoice and bill POST requests must return **≤ 2 seconds** for 95 % of calls. Batch posting of up to **1 000 entries** must complete within **30 seconds**.
* **Data Consistency** – Financial data (amounts, taxes, account codes) must be **100 % accurate**; any error in posting must be corrected via reversing entries. Failed transactions must be re‑queued automatically for retry.
* **Synchronization Window** – Customer/vendor master data sync should run at least **every hour**; payment status updates should be reflected in ERP within **15 minutes** of being recorded in the accounting system.
* **Security & Compliance** – Integrations must comply with accounting standards (GAAP/IFRS). User credentials and OAuth tokens must be stored securely. Only authorized users with finance roles may execute posting actions.
* **Support** – P1 finance integration outages require acknowledgement within **1 hour** and resolution within **4 hours**; posting errors resulting in financial misstatements must be corrected before the next business day.

### Responsibilities & Obligations

| Party | Obligations |
| --- | --- |
| **ERP/IMS** | Generate accurate financial data and mapping to GL accounts; respect accounting system rate limits; reconcile balances daily; maintain an audit trail of postings; handle duplicate or failed postings gracefully. |
| **Accounting System Provider** | Provide stable APIs and documentation; support sandbox for testing; maintain 99.9 % uptime; enforce appropriate access controls; notify ERP of planned maintenance or version changes. |

## Integration 4 – Sales Tax Service

### Scope

* Real‑time tax calculation for quotes and orders based on jurisdiction, product tax codes and customer exemptions.
* Committing completed transactions to the tax service for reporting and returns filing.
* Supporting tax adjustments for returns and refunds.

### Interfaces and Protocols

| Interaction | Direction | API/Channel | Payload | Notes |
| --- | --- | --- | --- | --- |
| **Calculate Tax** | ERP → Tax service | REST POST /api/v1/tax/calculate | Ship‑from and ship‑to addresses, order amount, line details with tax codes, customer exemption codes. | Called at checkout and order submission. |
| **Commit Transaction** | ERP → Tax service | REST POST /api/v1/tax/commit | Unique transaction ID, calculated tax, final amounts, document type (sale, refund), date. | Sent after payment capture or shipment. |
| **Adjust/Refund Transaction** | ERP → Tax service | REST POST /api/v1/tax/adjust | Original transaction ID, adjustment amount, reason (return, discount). | Ensures updated liability. |
| **Tax Rate & Code Sync** | Tax service → ERP | REST GET /api/v1/tax/rates / GET /api/v1/tax/codes | Jurisdiction rates, taxability rules. | Updated nightly or as published. |
| **Exemption Certificate Validation** | ERP → Tax service | REST GET /api/v1/tax/exemption/{certificateId} | Certificate details, status. | Validates before finalizing transaction. |

### Service Level Targets

* **Uptime** – The tax calculation API must be available **≥ 99.99 %** of the time. TaxJar advertises 99.99 % uptime for its sales tax API and sub‑20 ms response times【118742738972405†L9-L20】; similar providers (Avalara) offer near‑“four nines” availability. If uptime falls below 99.5 %, tax calls may default to configured backup rates.
* **Latency** – Average tax calculation response times should be **< 50 ms**, with a target of **sub‑20 ms** for 90 % of calls【118742738972405†L9-L20】. Commit and adjust calls must complete within **2 seconds**.
* **Accuracy** – Tax calculations must be **≥ 99 % accurate** and backed by an accuracy guarantee【118742738972405†L19-L20】. Incorrect tax calculations or delayed commits may result in penalties from tax authorities; thus, the integration must validate addresses and tax codes.
* **Resilience** – If the tax service is unavailable, the ERP must fall back to cached tax rates or manual calculation and flag orders for later reconciliation. All uncommitted transactions must be retried automatically until successful.
* **Security & Compliance** – Tax data must include sensitive personal information (addresses). All calls must use TLS; addresses and tax IDs must be encrypted at rest; logs must not contain full PII. Access tokens must be scoped appropriately.

### Responsibilities & Obligations

| Party | Obligations |
| --- | --- |
| **ERP/IMS** | Provide complete and accurate data (addresses, line items, tax codes); handle failures and retries; maintain audit trail of tax calculations and commitments; ensure backups for offline calculation; integrate exemption certificates. |
| **Tax Service Provider** | Offer high availability (≥ 99.99 % uptime) and low latency (sub‑20 ms); provide up‑to‑date tax rates and rules; maintain accuracy guarantee; support real‑time status monitoring; notify ERP of outages. |

## Common Reporting & Audit Requirements

Across all integrations, the ERP/IMS must record detailed logs of API calls, event publications and acknowledgements. Logs must include timestamps, request/response payloads (with sensitive fields masked), correlation IDs and error codes. These logs support:

* **Regulatory compliance and audit** – The tax integration demands an audit trail for every calculation and commit; financial integrations require traceability of journal entries and invoices; 3PL integrations need evidence of shipment and receiving events.
* **Service performance reporting** – Uptime, latency and error rates must be reported monthly to stakeholders. For example, DCL Logistics tracks order fulfilment speed and accuracy【570632324258247†L60-L119】, and TaxJar exposes its uptime and response time statistics【118742738972405†L9-L20】. Similar dashboards should be provided for each integration.
* **Issue diagnosis and SLA enforcement** – Detailed logs and metrics enable root cause analysis when service‑level targets are missed and support the calculation of service credits or penalties.

## Change Log and Review

This Integration Contracts & SLA document will be reviewed and updated quarterly or whenever significant changes are made to the integrations. Changes must be communicated to integration partners at least **30 days** in advance and must include both the updated contract and a summary of the impacts.