

GPhMLIMS

Laboratory Information Management System

Comprehensive User Manual & Operational Reference Guide
Version 2.0.0

Audience: Laboratory Staff, Lab Managers, and System Administrators

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1. Introduction & Overview

Welcome to the GPhMLIMS Laboratory Information Management System. This enterprise-grade platform is engineered specifically for geological, mineralogical, and chemical testing laboratories. The system coordinates the physical logging of core samples, laboratory processing operations, balance weights integration, results verification, inter-lab logistics, and tenant-based billing into a single unified React workspace.

GPhMLIMS utilizes a Clean Onion Architecture with a .NET 10 Web API backend. This architecture divides the system into distinct layers: the core Domain, Application services, database Infrastructure, and Web API. This guarantees high performance, testability, and strict security boundaries. Multi-tenancy is supported at the database and application levels, allowing multiple regional labs or companies to share infrastructure while keeping customer datasets strictly isolated.

[NOTE] *This User Manual outlines the operational details of the React frontend application. Following this guide ensures your laboratory maintains compliance with ISO standards, quality control tolerances, and secure chain-of-custody data logging.*

2. Login & Authentication Flow

GPhMLIMS protects customer data with strict authentication protocols. To sign in, users must provide a valid Organization ID along with their registered username and password credentials. Upon verification, the backend issues a secure JWT Bearer token, which authenticates all subsequent requests.

2.1 Organization Selection

Before logging in, users must select or enter their unique Organization ID. GPhMLIMS divides configurations, operations, and client lists dynamically based on the active Organization ID. To switch organizations, click the Organization Chip located in the Top Utility Bar, select an organization from the dialog, and enter your credentials.

2.2 Authentication Steps

Follow these steps to log in to the application:

- Navigate to the application URL. You will be redirected to the /login page.
- Enter your unique Organization ID (e.g. 'root' or a custom organization code).
- Enter your Username or registered email address.
- Enter your Password. Click the eye icon to toggle password text visibility.
- Click the 'Sign In' button. Upon successful verification, you will be redirected to the Dashboard.

[WARNING] *If you encounter a '401 Unauthorized' or 'Session Expired' notification*

while navigating, it means your token has expired. Refresh the page and log in again.

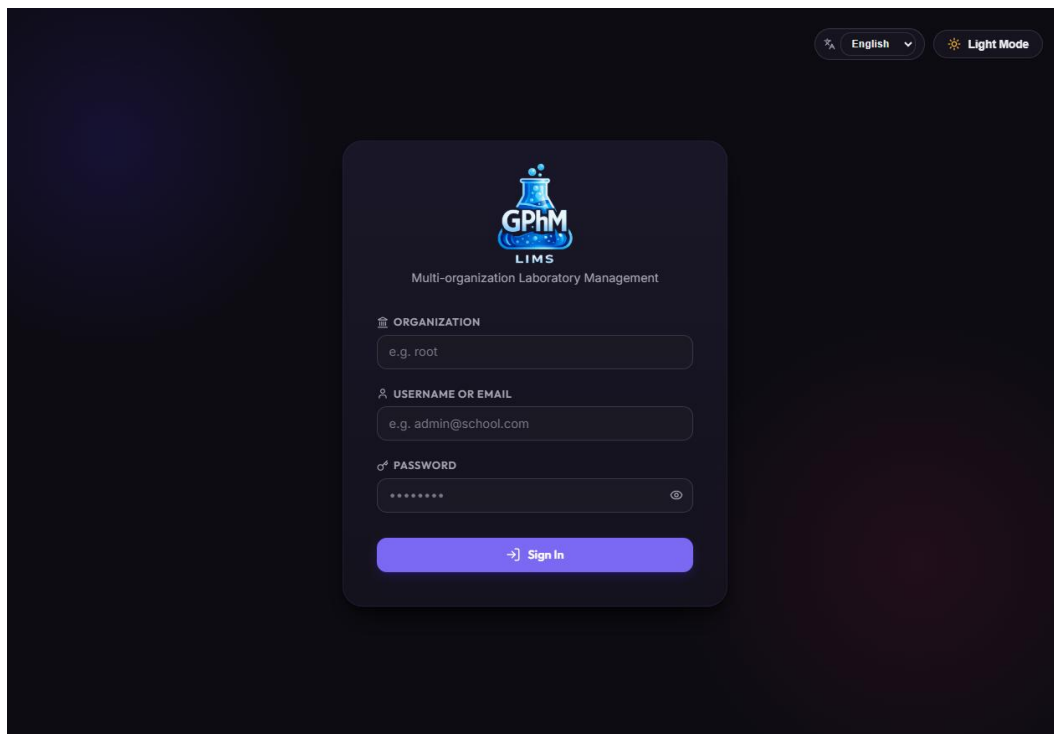


Figure 1: GPhMLIMS User Login & Organization Authentication Page

3. Dashboard & Workspace Overview

The Dashboard serves as the central hub of GPhMLIMS, providing a real-time summary of the laboratory's operational status. The main workspace displays status counters, performance charts, and notification modules.

3.1 Operational Metric Cards

Four KPI metric cards are positioned at the top of the Dashboard, summarizing work in progress:

- Active Job Profiles: Total number of active job orders registered in the system.
- Samples Registered: The cumulative count of registered samples across the current laboratory.
- Batches in Progress: The number of active batches prepared for testing.
- Pending Shipments: Inter-lab core/reject shipments currently in transit.

3.2 Dynamic Charts & Bottleneck Identification

The dashboard contains two interactive chart panels: the Job Status Distribution chart (showing pending, active, and completed jobs) and the Lab Workload chart (visualizing sample density

across laboratory branches). These charts help laboratory managers allocate resources and identify bottlenecks before they affect turnaround times.

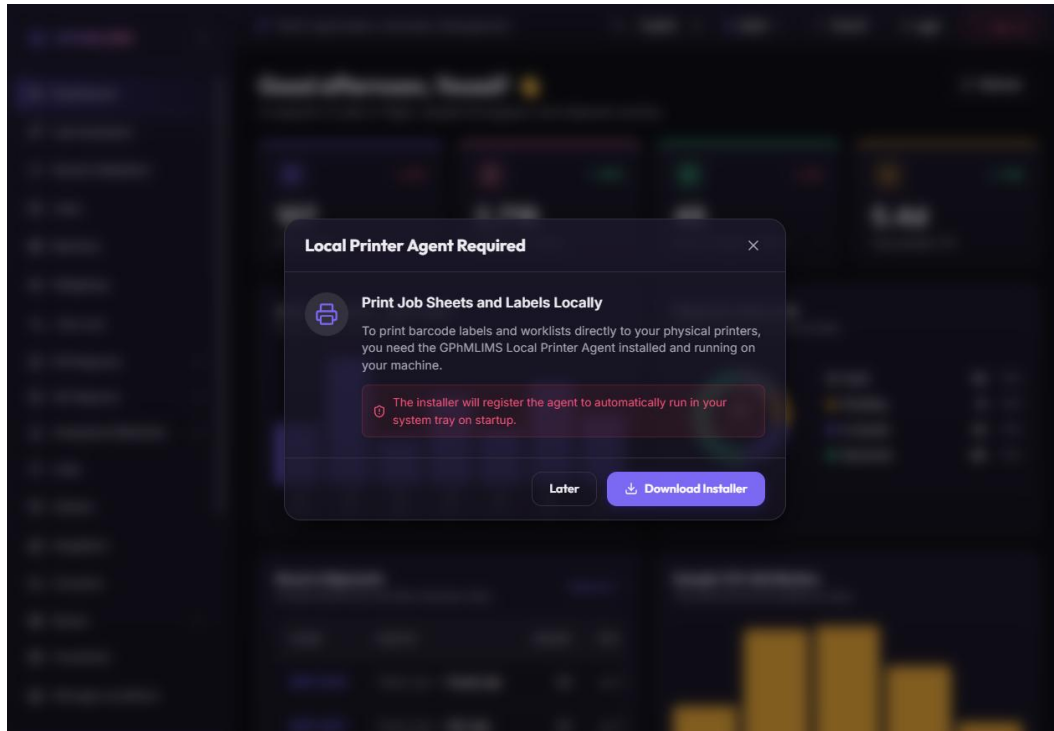


Figure 2: Real-time Operational Dashboard & Workload KPI Panel (showing Local Printer Agent Alert)

Local Printer Agent Connection Alert

As shown in Figure 2, when a user first signs in, GPhMLIMS checks if the local hardware communication agent (GPhMLIMSLocalPrinter) is active on the workstation. If the agent is not running or cannot be contacted, the system displays a warning dialog:

- **Agent Check:** The browser attempts to ping the local agent at `http://127.0.0.1:5000`. If this connection fails, the alert is triggered to notify the user that hardware integrations (bulk raw label printing and weighing balance communication) are currently disabled.
- **Direct Download Link:** The dialog contains a 'Download Printer Agent' button, allowing users to immediately fetch the installer for the printer service.
- **Bypassing the Alert:** If the user does not require printer/balance integration for their current session, they can click the 'Later' button. This dismisses the popup and saves a timestamp in their browser's local storage (`localStorage.setItem('gphmlims.localprinter.lastPromptTime', ...)`), preventing the alert from appearing again for a configured duration.

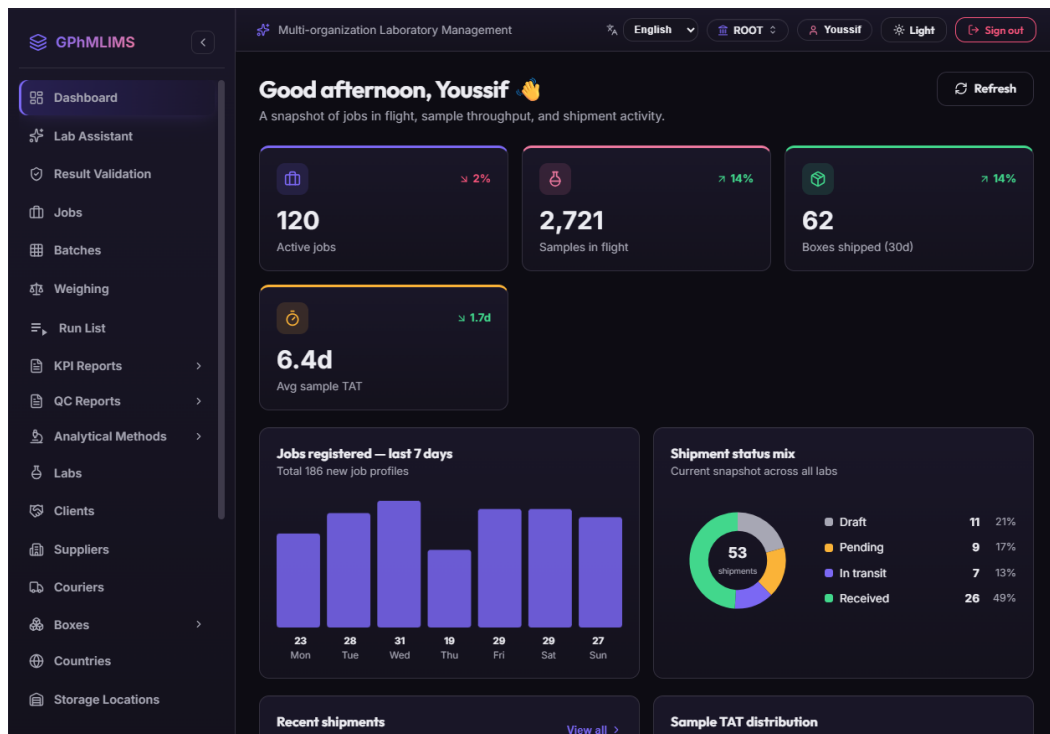


Figure 2b: Clean Operational Dashboard without system alerts

4. Sidebar & Navigation Menu System

Navigation is handled via a collapsible left-hand Navigation Menu (Sidebar) and a Top Header. The navigation elements automatically adapt based on your assigned user permissions.

4.1 Collapsible Sidebar Links

The sidebar links are grouped into logical sections. Clicking a group label (such as 'Analytical Methods' or 'Configurations') expands or collapses its submenu. If the sidebar is collapsed, submenus are hidden, and hover tooltips are shown instead.

4.2 Theme & Profile Toolbar

Located at the top right of the application shell, the utility bar provides: the User profile button (redirects to Account settings and local printer setup), the Theme toggle button (switches between Light and Dark styles), and the Sign Out button.

5. User Roles, Accounts, & Access Security

GPhMLIMS secures system resources using a role-based access control (RBAC) model. The system disables or hides menu options and restricts API endpoints based on user permissions.

5.1 User Management

On the Users page (System Access > Users), administrators can view all user accounts, check their active or disabled status, assign roles, and modify details. Administrators can also invite new users and temporarily disable accounts during audits.

NAME	EMAIL	PHONE	ROLE	MIN QUOTE APPROVAL	MAX QUOTE APPROVAL
Hany Fahmy	TestH@gphmlims.com	—	MANAGER	0.00	0.00
Test test	test@gphmlims.com	—	MANAGER	1,000.00	50,000.00
Maria Takla	Maria@yahoo.ca	6046001830	MANAGER	0.00	0.00
John Don	John@gphmlims.com	—	MANAGER	1,000.00	2,000.00
Youssef Takla	admin.root@abcschool.com	—	MANAGER	1,000.00	200,000.00
GoStory Media	mediagostory@gmail.com	—	MANAGER	0.00	10,000.00
Paul Takla	paul@yahoo.com	6046001831	MANAGER	0.00	0.00

Figure 3: System Users Management Grid

5.2 Configuring Roles & Permissions

On the Roles page (System Access > Roles), administrators can manage system roles. Select a role to open its permission checklist. Changes made here apply immediately to all users assigned to that role, re-configuring their UI layout on their next page load.

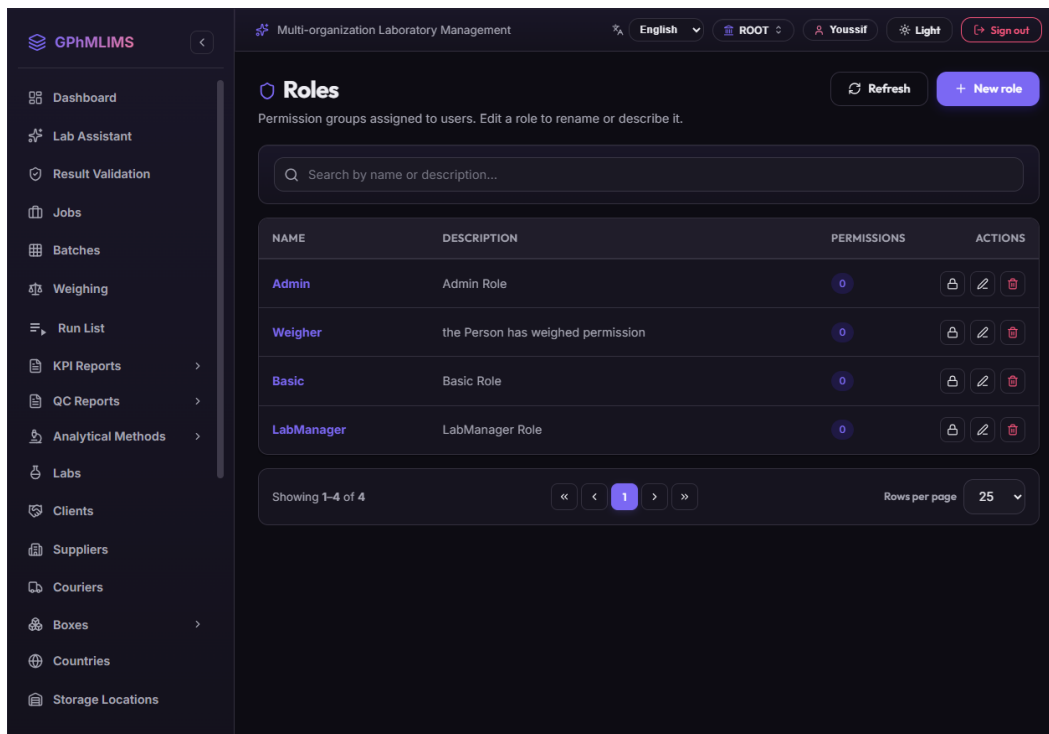


Figure 4: Role-Based Access Control and Permission Assignment Matrix

6. Core Operations: Creating & Managing Jobs

A 'Job' (or Job Profile) represents a customer sample shipment. Registered samples, tests, logistical coordinates, and invoices are all organized under a parent Job.

6.1 Creating a Job Profile

To register a new job: Navigate to the Jobs page and click the 'New Job' button. Choose whether to create a new job profile or copy configuration from a Template Job. Select the Lab (Receiving lab location), Client, and Client Project (Project Code). Choose the Job Type: Client (standard customer project) or Internal (internal testing/calibration). Click 'Create'. The system increments the sequence seed in the database and generates a unique Job Code.

Analytical Job Profiles
Create, configure, and analyze sample processing profiles.

Search by code, client, project description...

JOB CODE	CLIENT	PROJECT DESCRIPTION	LAB	REGISTERED	STATUS	LOCKED BY
VAN26000276	Apex Mining Ltd (APEX-MIN)	vancouver proect	Vancouver Lab	Jun 30, 2026	ACTIVE	Open
VAN26000275	Yousseif (CLiYou1)	Standard Testing Project	Vancouver Lab	Jun 29, 2026	ACTIVE	Open
VAN26000274	Yousseif (CLiYou1)	Standard Testing Project	Vancouver Lab	Jun 27, 2026	ACTIVE VALIDATED	Open
VAN26000273	Yousseif (CLiYou1)	Standard Testing Project	Vancouver Lab	Jun 25, 2026	ACTIVE VALIDATED	YOUSSEF TAKLA

Showing 1-4 of 4 Rows per page: 25

Figure 5: Active Job Profiles list and registration panel

6.2 Job Editor Workspace

The Job Editor provides a detailed view of a job's status and configurations, divided into several tabs:

- **General Tab:** Core metadata including client info, project info, order numbers, registered dates, and priority adjustments.
- **Other Details Tab:** Billing client addresses, contact preferences, tax rates, and specific project invoicing options.
- **Samples Tab:** Grid showing all registered samples under the job, including weights, tare, and QC status.
- **Schemes Tab:** Analytical schemes requested for this job (e.g., ICP-MS, Fire Assay). You can configure box code prefixes and page size limits here.
- **Create Records Tab:** Generates storage core boxes and analytical worklist layouts for the registered samples.
- **Audit Log Tab:** A comprehensive, regulatory-compliant audit log that records every state change, transaction, and data edit made to the job profile, its associated schemes, and its physical samples. It tracks the exact timestamp, active user, action type (e.g., ADD, UPD, WEB), and detailed descriptions, complete with side-by-side comparison panels of the modified JSON payloads (showing the 'Change From' and 'Change To' states of individual values like sample weights, type classifications, and generated storage boxes).

GPhMLIMS

Multi-organization Laboratory Management

English

ROOT

Youssif

Light

Sign out

Dashboard

Lab Assistant

Result Validation

Jobs

Batches

Weighing

Run List

KPI Reports

QC Reports

Analytical Methods

Labs

Clients

Suppliers

Couriers

Boxes

Countries

Storage Locations

←

Edit Job Profile: VAN26000273

READ-ONLY (VALIDATED)

Configure procedures, record samples, and generate worksheets.

General

Other Details

Samples

Schemes

Create Records

Print Reports

Audit Log

Client & Project Details

CLIENT

Youssif (CLY001)

PROJECT

Standard Testing Project (PROJ-01)

PO / ORDER NO

CLIENT CONTACT

NONE

PRIORITY

NORMAL

Timeline & Settings

REGISTERED DATE

2026-06-25

RECEIVED DATE

2026-06-24

TAT (DAYS)

29

REQUIRED DATE

2026-07-24

CONVERSION CODE

NONE

QUOTE (FOR INVOICING)

-- No quote (use client default / price list) --

DON'T COMBINE THIS JOB IN BATCHES

When checked, this job's samples are batched on their own and never pooled with other jobs.

Job Notes

Figure 6: Job Editor - General Metadata Tab

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Result Validation

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QC Reports

Analytical Methods

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Clients

Suppliers

Couriers

Boxes

Countries

Storage Locations

←

Edit Job Profile: VAN26000273

READ-ONLY (VALIDATED)

Configure procedures, record samples, and generate worksheets.

General

Other Details

Samples

Schemes

Create Records

Print Reports

Audit Log

Job Profile Type

NORMAL (ACTIVE JOB)

Sample Type

SOIL/SILT SAMPLE

Validated Date

2026-06-27

Invoiced Date

yyyy-mm-dd

By Youssif Takla

Receival

Analyzing Lab

Job QA

Storage

Analysis

Reporting

Invoicing

Receiving Lab

NONE

International Sample

NO

Delivery Shipment ID

Origin Country

Origin Region

Delivery Courier

NONE

Radiation Flag

Delivery Waybill

Shipping Date

yyyy-mm-dd

Delivery Charge (\$)

0

First Sample Job

Estimated No. Samples

Sample Condition

Missing Samples

Extra Samples

Figure 7: Job Editor - Other Details Tab

GPhMLIMS

Dashboard

Lab Assistant

Result Validation

Jobs

Batches

Weighing

Run List

KPI Reports

QC Reports

Analytical Methods

Labs

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Couriers

Boxes

Countries

Storage Locations

Multi-organization Laboratory Management

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Light

Sign out

Edit Job Profile: VAN26000273

READ-ONLY (VALIDATED)

Configure procedures, record samples, and generate worksheets.

General

Other Details

Samples

Schemes

Create Records

Print Reports

Audit Log

Client ID

Samples

Samples Scheme Analytical

Result

Samples List (100)

SEQ	SAMPLE ID	SAMPLE IDENT	EXTERNAL IDENT	SAMPLE TYPE	WEIGHT	UNIT
3	0000004578	VAN26000273.003	SMP-001	SOIL/SILT	15.1	g
4	0000004579	VAN26000273.004	SMP-002	SOIL/SILT	15.4	g
5	0000004580	VAN26000273.005	SMP-003	SOIL/SILT	27.6	g
6	0000004581	VAN26000273.006	SMP-004	SOIL/SILT	27.6	g
7	0000004582	VAN26000273.007	SMP-005	SOIL/SILT	27.6	g
8	0000004583	VAN26000273.008	SMP-006	SOIL/SILT	27.6	g
9	0000004584	VAN26000273.009	SMP-007	SOIL/SILT	27.6	g

Figure 8: Job Editor - Samples Tab

GPhMLIMS

Dashboard

Lab Assistant

Result Validation

Jobs

Batches

Weighing

Run List

KPI Reports

QC Reports

Analytical Methods

Labs

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Boxes

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Sign out

Edit Job Profile: VAN26000273

READ-ONLY (VALIDATED)

Configure procedures, record samples, and generate worksheets.

General

Other Details

Samples

Schemes

Create Records

Print Reports

Audit Log

ANALYTICAL SCHEMES & ANALYTES

SEQ	SCHEME	PRICE FIXED	PRICE CODE	SPLIT TEMPLATE	BOX PREFIX	BOX S
>	PRP001 Prep Scheme 1		BUNPri	SCH-FIRE-0	FIRE	20
>	SORT Sorting Scheme		NONE	NONE		0
>	VAS01 VAN Assay Scheme 01		PRICE-	SCH-01 (WG	WQT	10
>	HeavyMetals Heavy Metals Panel	N	PRICE-	SCH-02 (SO	SOL	15
>	FA Fire Assay	N	PRICE-A	SCH-FIRE-0	FIRE	20

Figure 9: Job Editor - Schemes Configuration Tab

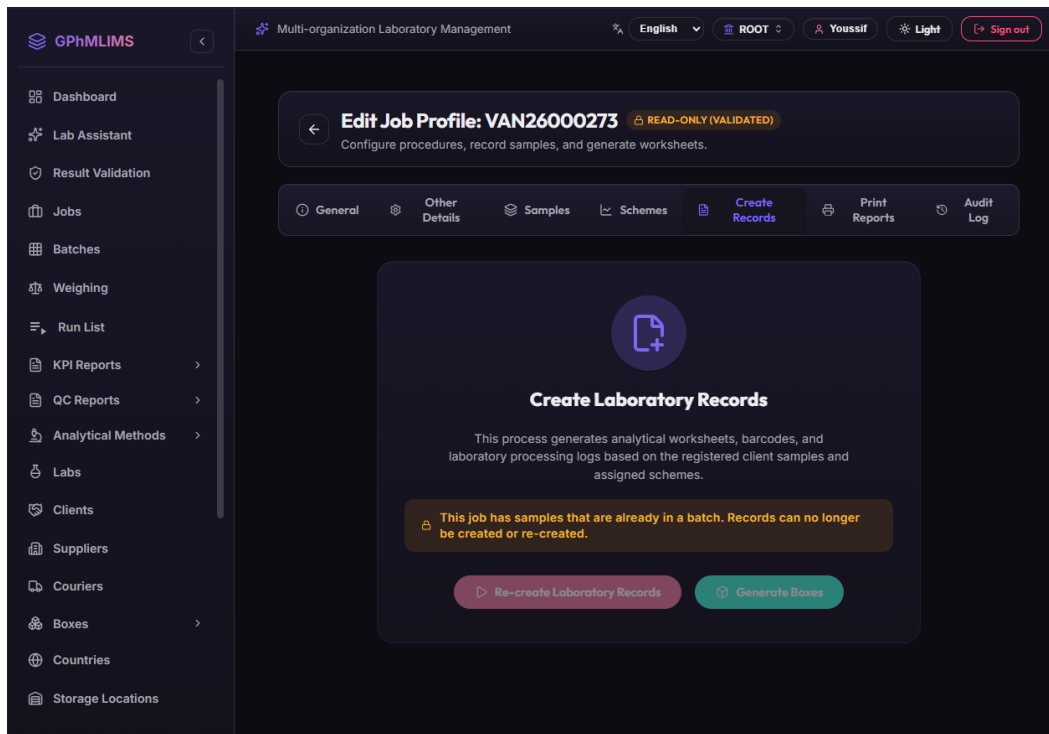
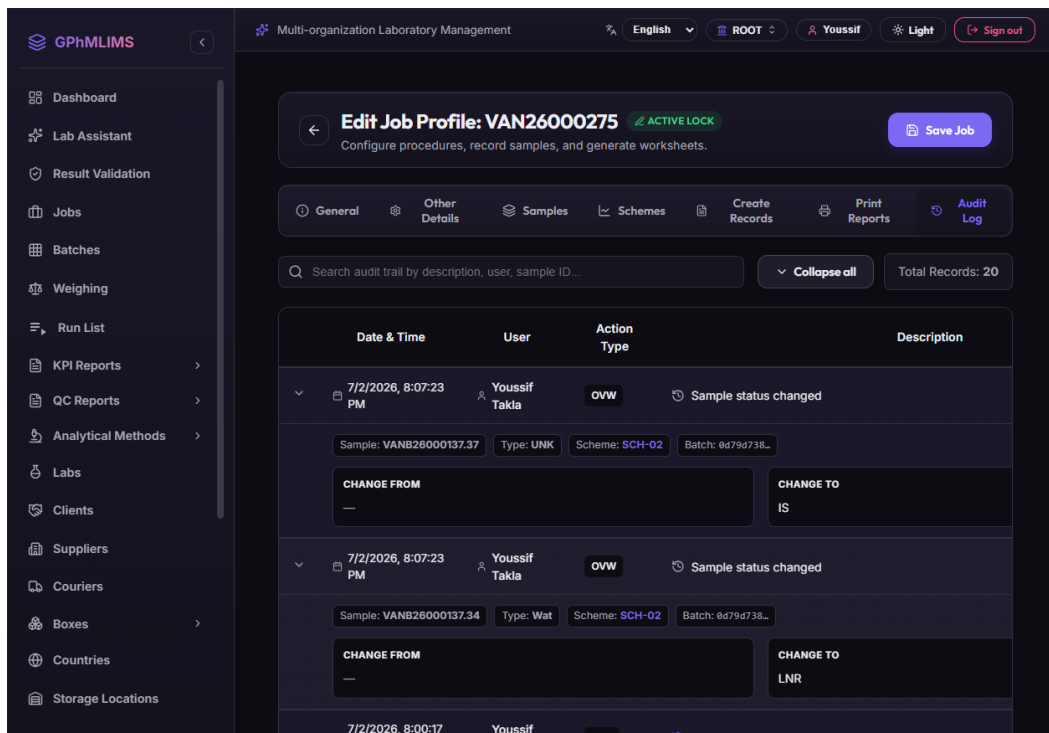


Figure 10: Job Editor - Create Records & Worksheet Generation Tab



7. Sample Registration, Logging, & Barcoding

After registering a Job, the next step is log-in and barcoding of the individual physical samples.

7.1 Naming Sequences & Identifiers

Sample identifiers are built from the parent Job Code and a suffix sequence (e.g. VAN26000273.001, VAN26000273.002). This naming convention ensures samples can be traced back to their parent job profile throughout preparation, testing, and disposal.

7.2 Registering Samples

To register samples: Open the Job Editor for the target job and navigate to the Samples tab. Click 'Register Samples'. Enter the weight of each sample, choose the Sample Type (pulp, reject, core), and input any client identifiers. Print and apply barcode labels to the sample containers. You can configure label formats in the Account page.

8. Analytical Execution: Batch Assembly & QC Configuration

Before testing samples, you must assemble them into analytical batches. GPhMLIMS includes quality control (QC) configuration tools to ensure testing runs meet compliance requirements.

8.1 Creating a Analytical Batch

Navigate to Batches > New Batch: Select the Lab location and the target Analytical Scheme. The system filters all samples registered for this scheme that have been boxed and are ready for analysis. Choose either 'By Job' mode (lazy-load and select specific sample boxes) or 'By Sample' mode (for re-batching specific samples). Click 'Save' to create the batch and generate a unique Batch ID.

The screenshot shows the 'Batches' page in the GPhMLIMS application. The left sidebar contains navigation links: Dashboard, Lab Assistant, Result Validation, Jobs, Batches (selected), Weighing, Run List, KPI Reports, QC Reports, Analytical Methods, Labs, Clients, Suppliers, Couriers, Boxes, Countries, and Storage Locations. The main content area is titled 'Batches' and includes a subtitle: 'Analytical batches generated from procedure-schemes. Source samples come from jobs in your lab.' Below the subtitle are 'Refresh' and '+ New Batch' buttons. A search bar is labeled 'Filter by batch code or job code...'. The table below lists several batches with columns: BATCH NO, JOB(S), LAB, SCHEME, CLIENT SAMPLES, QC SAMPLES, TOTAL SAMPLES, and STATUS.

BATCH NO	JOB(S)	LAB	SCHEME	CLIENT SAMPLES	QC SAMPLES	TOTAL SAMPLES	STATUS
VANB26000140	VAN26000276	VAN	SCH-02	16	6	22	DRAFT
VANB26000139	VAN26000276	VAN	SCH-02	38	11	49	DRAFT
VANB26000138	VAN26000276	VAN	SCH-02	38	11	49	DRAFT
VANB26000137	VAN26000275, VAN26000276	VAN	SCH-02	34	15	49	DRAFT
VANB26000136	VAN26000275	VAN	SCH-02	38	11	49	DRAFT
VANB26000135	VAN26000275	VAN	SCH-02	36	13	49	DRAFT
VANB26000134	VAN26000274	VAN	scheme-wqa	11	4	15	VALIDATED
VANB26000133	VAN26000274	VAN	scheme-wqa	30	7	37	VALIDATED

Figure 11: Analytical Batches Grid and Creation Page

8.2 Quality Control (QC) Insertion Rules

Once the batch is created, go to the Batch QC Config page. You must configure the QC standards, blanks, and duplicates configuration:

- Blanks: Set the start position and frequency (e.g., insert a blank container every 20 positions).
- Duplicates: Set the duplicate replication frequency (e.g., duplicate every 10th sample in the run).
- Standards: Choose standard materials from your inventory and place them in target positions.

8.3 Quality Control (QC) Position Configuration

Laboratory managers can configure detailed position mappings for QC standards, blanks, and duplicates. The Batch QC Config page allows you to set blank insertion offsets, duplicates positions, and drag standard materials directly into specific target run sequence coordinates.

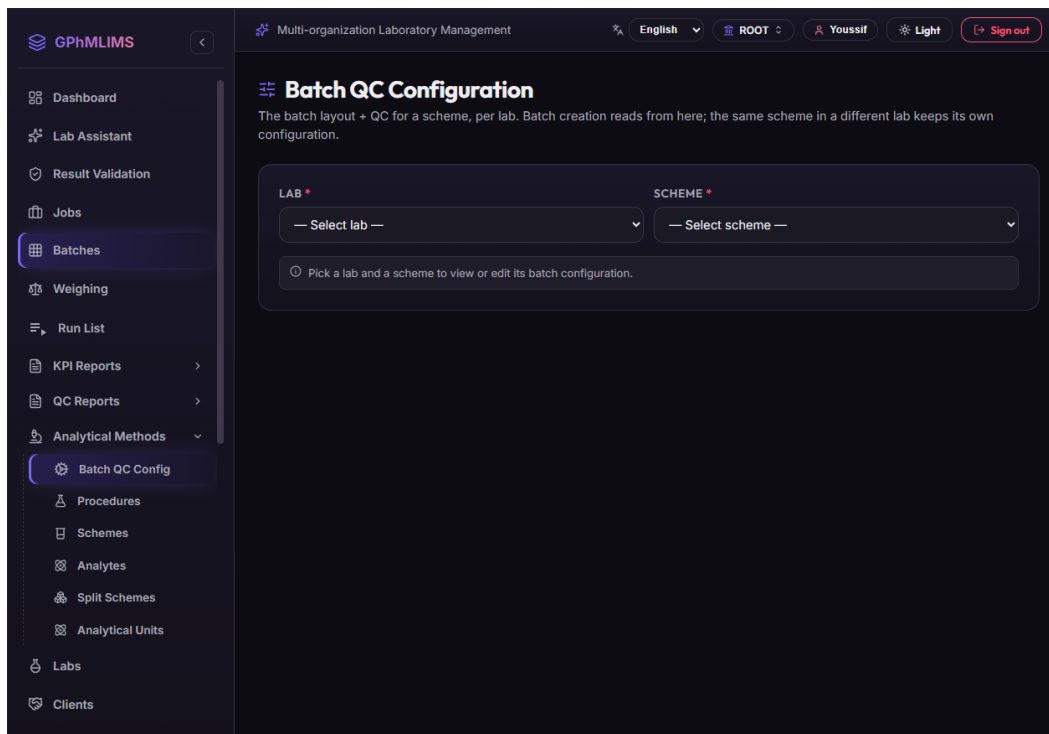


Figure 12: Batch QC Position & Standard Insertion Configuration Panel

8.4 Sample Split Schemes

When a sample requires split analysis (such as dividing a pulp into multiple splits to be tested by different methods), split schemes map the daughter samples, parent-child tracking relationships, and billing allocations.

Split schemes

Box-naming convention (prefix + page size) per analytical scheme — used when generating boxes during job creation.

Search by scheme ID or box prefix...

SCHEME	BOX PREFIX	BOX SIZE	ACTIONS
SCH-01	WQT	10	
SCH-02	SOL	15	
SCH-FIRE-01	FIRE	20	
SCH-GOLD-01	GOLD	20	
SCH-ICP-01	ICP	25	

Showing 1-5 of 5 Rows per page: 25

Figure 13: Split Schemes configuration table

8.5 Analytical Procedures (Methods) Setup

Analytical Procedures are laboratory methods (e.g. multi-acid digest, aqua regia, fire assay) configured in the lab. Administrators set active switches for reporting ('reportactive') and invoicing ('invoiceactive') to control their use across workloads.

CODE	DESCRIPTION	CLIENT	GROUP	SCHEMES	ACTIONS
PROC-SEED	Seed Procedure	Youssif	-	0	
MET-TRACE-02	Trace Heavy Metals Screening	Apex Mining Ltd	TOX	0	
EFF-FULL-03	Full Effluent Quality Verification	EcoTech Solutions	ENV	0	
WAT-STD-01	Standard Drinking Water Analysis	Global Water Corp	ENV	0	
AU-MAJOR	Major Gold Analysis Procedure	Global Mining Corp	GOLD	0	

Figure 14: Analytical Procedures and Method settings configuration table

8.6 Certified Reference Materials (CRM) / Standards Setup

Standards (CRMs) are inserted into batches to monitor accuracy. Administrators register standard codes, target values, standard deviations, and expiration dates. The system supports defining certified target values, uncertainties, and control limits globally or specifically per analytical scheme (such as Fire Assay, ICP, etc.) via the StandardSchemeAnalytes configuration. A standard must be flagged as active to be selected in Batch QC configurations. When editing a standard, schemes and their per-scheme certified analyte values are automatically saved when clicking the main "Save changes" button in the standard editor modal.

CODE	NAME	MATRIX	LOT	EXPIRES	REMAINING	STATUS	ACTIONS
CDN-ME-1414	CDN-ME-1414 Reference Standard	Oxide Ore	1414-2026	—	500 g	ACTIVE	[Edit] [Delete]
OREAS-25A	Oreas 25A - Gold Reference Standard	Sulfide Ore	25A-2026	—	1000 g	ACTIVE	[Edit] [Delete]
OREAS-27A	Oreas 27A - Gold Reference Standard	Sulfide Ore	27A-2026	—	1000	ACTIVE	[Edit] [Delete]
CDN-ME-1414	CDN-ME-1414 Reference Standard	Oxide Ore	1414-2026	—	500 g	ACTIVE	[Edit] [Delete]
OREAS-25A	Oreas 25A - Gold	Sulfide Ore	25A-2026	—	1000 g	ACTIVE	[Edit] [Delete]

Figure 15: Certified Reference Materials (CRM) list with target values and status

9. Sample Weighing Operations

After assembling analytical batches, technicians must weigh each individual sample container (pulp, reject, or core) and log the weights in GPhMLIMS. The Weighing page (accessible under Operations > Weighing or at the '/weighing' route) enables real-time data capture from laboratory balances.

To complete sample weighing: Select the target Lab Location and select the Analytical Batch from the drop-down menu. Select the active Balance from the balance drop-down menu. The list of balances is dynamically loaded from your configured instruments list. Place each sample on the physical balance. If using an integrated balance connection, press the capture hotkey (or click 'Capture') to retrieve the weight value. If not, type the weight manually in the input grid. Verify the weight stability indicator. The system flags unstable readings to prevent errors. Click 'Save and Finish' once all samples in the run are weighed. This locks the weights and prepares the batch for analytical testing.

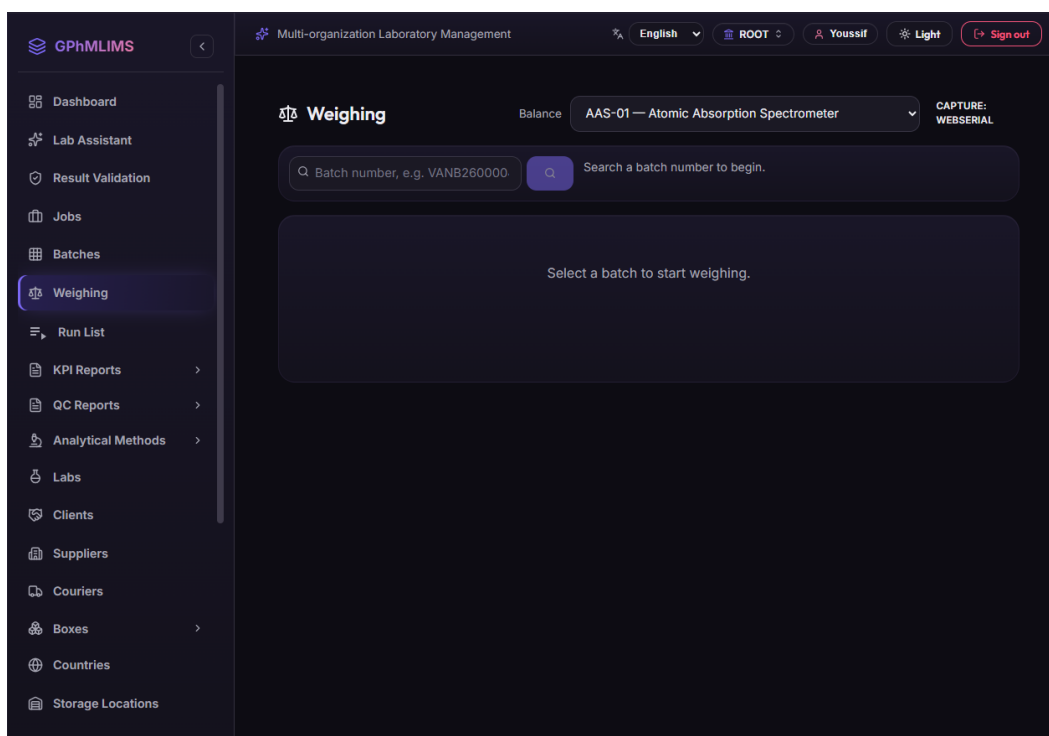


Figure 16: GPhMLIMS Sample Weighing panel with real-time balance data capture

10. Results Validation & Data Entry

Once testing is complete, the results are entered back into GPhMLIMS for validation, auditing, and export.

10.1 Batch Results Entry

Navigate to Batches and click 'Results' next to the target batch. The results entry grid displays the batch positions, samples, QC controls, and analyte columns. You can manually enter values for each analyte, or upload instrument data files (e.g. CSV, XML) to populate the grid automatically.

10.2 Verification & QC Pass/Fail Flags

The validation engine checks each entered value. It flags any data that falls outside configured tolerances:

- **Detection Limits:** Values below minimum detection limits are highlighted as '< DL'.
- **Standards Tolerances:** Values for control standards are compared against expected targets. If a standard value differs by more than 2 or 3 standard deviations (2SD/3SD), the cell is highlighted in yellow or red.
- **Duplicate Variance:** The system calculates the variance between primary samples and duplicates. If it exceeds configured limits, a duplicate variance warning is triggered.

SAMPLE	CUID	JOB CODE	SAMPLE IDENT	EXTERNAL IDENT
VANB26000140.01	0000005546	VAN26000276	-	Blank
VANB26000140.02	0000005547	VAN26000276	-	Blank
VANB26000140.03	0000005548	VAN26000276	-	CDN-ME-1414
VANB26000140.04	0000005549	VAN26000276	-	OREAS-25A
VANB26000140.05	0000005485	VAN26000276	VAN26000276.088	SMP-085
VANB26000140.07	0000005486	VAN26000276	VAN26000276.089	SMP-086
VANB26000140.08	0000005487	VAN26000276	VAN26000276.090	SMP-087
VANB26000140.09	0000005488	VAN26000276	VAN26000276.091	SMP-088
VANB26000140.10	0000005489	VAN26000276	VAN26000276.092	SMP-089
VANB26000140.11	0000005490	VAN26000276	VAN26000276.093	SMP-090
VANB26000140.12	0000005491	VAN26000276	VAN26000276.094	SMP-091
VANB26000140.13	0000005492	VAN26000276	VAN26000276.095	SMP-092
VANB26000140.14	0000005493	VAN26000276	VAN26000276.096	SMP-093
VANB26000140.15	0000005551	VAN26000276	-	CDN-ME-1414
VANB26000140.16	0000005494	VAN26000276	VAN26000276.097	SMP-094
VANB26000140.17	0000005495	VAN26000276	VAN26000276.098	SMP-095

Save stores values in the batch only (status SV); nothing reaches the job until the batch is validated. Validate a sample marks it ready; Validate Batch then copies every ready reading back to the job in one step. To redo a result: unvalidate the scheme (Job → Schemes), Unvalidate Batch, unvalidate the sample, then rebatch it (Create Batch → By Sample). Moving a sample to a new batch marks its old reading RB (Rebatch) — the old batch still validates but skips it.

Figure 17: Batch Analytical Results Grid and QC Validation Flags

10.3 System Audit Trail & Logging

To ensure regulatory compliance (such as ISO 17025 and GLP standards) and strict quality control, GPhMLIMS maintains an automated audit trail tracking critical events throughout the analytical lifecycle. Every single data modification, transaction, and state change is captured, guaranteeing a transparent and tamper-evident history of laboratory operations.

The system's job-level auditing provides a powerful mechanism to review operations. For example, in Job VAN26000275, the audit trail records detailed transactional actions:

- **Weight Overwrites:** When laboratory analysts adjust or correct a sample weight (e.g., correcting an entry from 18.6g to 9.0g), the system records the exact description 'Sample weight overwritten', showing the original and new weights in side-by-side Change From/To panels.
- **Box Generation:** When shipping or storage boxes are assembled for a job, GPhMLIMS logs the bulk creation action, recording the exact list of generated box codes (e.g., VAN26000275-SOL01 through SOL08, GOLD01 through GOLD06, and FIRE01 through FIRE06) directly inside the Change To detail.
- **Bulk Sample Creation:** When sample records are registered for a job, the system logs the event along with a JSON summary detailing the composition of the creation (e.g., 'Generated 108 laboratory sample records: 100 client samples, 6 duplicates, and 2 blanks').
- **Granular Field Diffs:** When multiple samples are updated simultaneously in the grid, GPhMLIMS does not just log a generic update message. It records a structured list of updated items, showing exactly which fields were changed (such as SampleType,

ExtraSample flag, Worklist Status, and QC Report active status) with their exact before-and-after values.

- Database and State Transitions: Key lifecycle changes, including activating or creating job records, modifying client invoice/reporting settings, and updating QC named standards (like CDN-ME-1414 or OREAS-26A), are captured chronologically.

The Audit Log Tab organizes these chronological records in a paginated, search-enabled table. Users can search by description, action, or user ID. Clicking the 'Expand all' button expands the rows to present the Change From and Change To panels with full XML/JSON data and context chips (such as Sample ID, Sample Type, Scheme, and Analyte), making auditing simple and efficient.

11. Instrument Run Lists

The Run Lists module (Operations > Run Lists) compiles and generates work orders for laboratory instruments (such as ICP spectrometers or carbon analyzers). Coordinators filter sample boxes by location, instrument, scheme, or task, select the target trays, and generate run sheets.

Key capabilities of the Run Lists module include: Run List Generation (Selecting eligible sample boxes and generating a structured run list. This outputs an instrument-readable CSV file containing sample layout sequences) and Run List Rollback (Administrators can clear existing run list files using the Rollback card. Entering the Run Number deletes the mapping and resets the associated box tasks back to uncompleted, allowing coordinators to re-compile the run).

The screenshot displays the 'Create Instrument Run Lists' interface within the GPhMLIMS application. The interface is divided into a left sidebar and a main content area. The sidebar contains a navigation menu with items: Dashboard, Lab Assistant, Result Validation, Jobs, Batches, Weighing, Run List (highlighted), KPI Reports, QC Reports, Analytical Methods, Labs, Clients, Suppliers, Couriers, Boxes, Countries, and Storage Locations. The main content area has a header with 'Multi-organization Laboratory Management', language and user settings, and a 'Sign out' button. Below the header, the title 'Create Instrument Run Lists' is followed by a subtitle: 'Select uncompleted boxes, generate instrument files, and complete box tasks.' The main section is titled 'FILTER CRITERIA' and includes several filter groups: 'LABORATORY' with a dropdown '-- Select Lab --', 'LOCATION' with a dropdown '-- Select Location --', 'INSTRUMENT' with a dropdown '-- Select Instrument --', 'SCHEME (PROCEDURE)' with a dropdown '-- Select Scheme --', 'TASK' with a dropdown '-- Select Task --', and 'JOB CODE (FILTER)' with a text input 'Type job code...' and a 'Search' button. Below these filters is a 'TRAY / RACK NO (OPTIONAL)' field with a placeholder 'e.g. Tray 01'. A section titled 'ELIGIBLE BOXES FOR RUN' contains a large dashed box with the text 'SELECT A LABORATORY TO START.' At the bottom, there is a 'Rollback / Clear Existing Run List' section with a warning message: 'If you need to re-generate a run list file or correct mistakes, enter the Run Number below. Clearing a run will delete the instrument run mapping and reset the box task completed date back to uncompleted.' Below this message is a field labeled 'RUN NUMBER TO CLEAR'.

Figure 18: Instrument Run Lists generation panel with rollback control

12. Storage Locations & Grid Inventory Management

GPhMLIMS maps physical warehouse storage locations down to the shelf level to manage core boxes, pulp rejects, and sample splits.

12.1 Storage Locations Tree

Navigate to Logistics > Storage Locations. The left panel shows the storage tree hierarchy: Warehouse > Core Room > Aisles > Rows > Shelves > Racks. You can add, edit, or delete items, and view capacity percentages for each shelf.

12.2 Grid View & Box Coordinates

Selecting a shelf opens a grid layout page. It shows occupied and empty slots. To assign a box to a coordinate, click an empty slot, search for the Box Code, and save. You can move boxes between slots by dragging them to an empty grid space.

NAME	CODE	TYPE	LAB	CAPACITY	ACTIONS
> Vancouver38	Van38	WAREHOUSE	Vancouver Lab	5	+ ✎ ⛶ 🗑
> Van	St120	ROOM	Vancouver Lab	50	+ ✎ ⛶ 🗑
Vancouver74	Van74	SHELF	—	5	+ ✎ ⛶ 🗑
Vancouver42	Van42	SHELF	—	5	+ ✎ ⛶ 🗑
Vancouver15	Van15	SHELF	—	5	+ ✎ ⛶ 🗑
Vancouver37	Van37	SHELF	—	5	+ ✎ ⛶ 🗑
Vancouver49	Van49	SHELF	—	5	+ ✎ ⛶ 🗑
Vancouver98	Van98	SHELF	—	5	+ ✎ ⛶ 🗑
Vancouver08	Van08	SHELF	—	5	+ ✎ ⛶ 🗑
Vancouver88	Van88	SHELF	—	5	+ ✎ ⛶ 🗑

Figure 19: Physical Storage Locations Hierarchy and Rack Allocation Grid View

12.3 Storage Containers (Stcontainers)

Storage Container configuration defines the dimensions, capacities, and constraints of core boxes, pulp bags, and reject trays. This enables accurate volumetric capacity planning for shelves and warehouse locations.

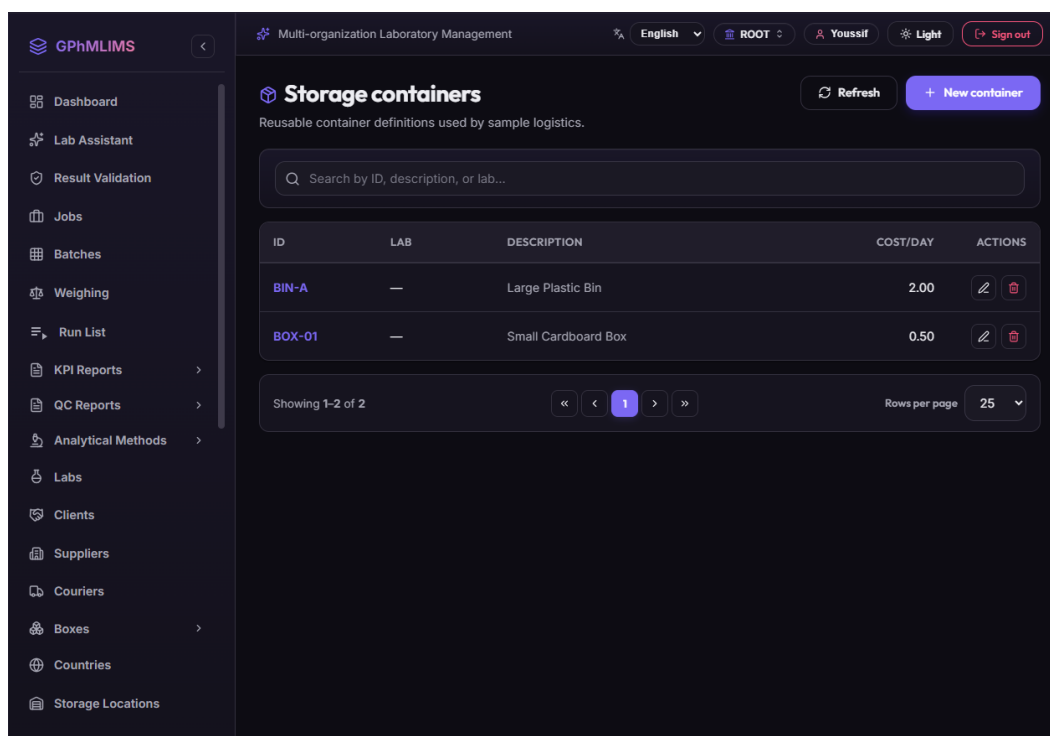


Figure 20: Storage Container types configuration page

13. Logistics: Shipping & Transfers Between Laboratories

When boxes must be sent to another lab branch for specialized testing, GPhMLIMS tracks the movement via the Box Shipments module.

13.1 Creating a Shipment

Go to Box Shipments > New Shipment. Select the Dispatch Laboratory and the destination Receiving Laboratory. Choose the Courier, enter the cargo Waybill tracking number, and specify the ship date. Click 'Pick Boxes' to open the selection drawer. Scan or select the Box Codes to add to the shipment. Click 'Ship'. The shipment status changes to 'In Transit', and the boxed samples are locked for edits.

13.2 Receiving a Shipment

When the shipment arrives, the receiving lab user opens the Shipment Detail page, verifies the physical box count against the shipment list, enters any arrival notes, and clicks 'Receive'. The system then prompts the user to place the boxes into local storage locations.

14. Client Invoicing & Invoices

The Invoicing module enables laboratory billing coordinators to compile and save invoices. Invoices can be generated for a single job or aggregated across multiple jobs belonging to a client. The Invoice Wizard allows you to select which analytical schemes to include in the bill, adjust currency exchange factors, apply tax codes, and calculate final totals.

INVOICE NO	CLIENT	LAB	DATE	SAMPLES	NET	STATUS	ACTIONS
INV-000104	Youssif	Vancouver Lab	6/28/2026	214	47,516.50 EUR	VOIDED	
INV-000101	Youssif	Simther	6/14/2026	5	1,181.25 USD	DRAFT	
CN-000001	Youssif	Vancouver Lab	6/24/2026	107	-0.05 CAD	CREDIT	
INV-000102	Youssif	Simther	6/19/2026	10	2,625.00 USD	AUTHORISED	
INV-000001	Youssif	Vancouver Lab	6/24/2026	107	0.05 CAD	CREDITED	
INV-000103	Youssif	Simther	6/9/2026	3	708.75 USD	VOIDED	

Figure 21: Invoice Wizard displaying multi-job scheme selection and calculations

15. Quotation System

Before registering a job, clients can request a cost estimate. The Quotation System allows managers to build price quotes based on the client's requested schemes, analyte counts, and sample volumes. Once approved, quotes can be converted into active jobs, automatically copying pricing codes and tax configurations.

QUOTE CODE	CLIENT	LAB	QUOTE DATE	DISCOUNT	SAMPLES	POT. REVENUE	STATUS	ACTIONS
QVAN26000001	Youssif	Vancouver Lab	7/6/2026	10%	300	170,100.00	ACTIVE	[icon]
Q-2026-001	Apex Mining Ltd	Simther	5/31/2026	10%	200	147,000.00	ACTIVE	[icon]

Figure 22: Quotation editor with cost estimation and price code selection

16. Analytical Instruments & Price Configuration

GPhMLIMS maintains registers of laboratory hardware and billing rates.

12.1 Instrument Inventory

Under Inventory > Instruments, manage lab equipment (e.g. ICP-MS, AA, XRF Spectrometers). You can log manufacturer info, serial numbers, current operational status (active/maintenance), and maintenance history. This database connects to the Run List module to track which instrument processed a batch.

12.2 Price Lists

Under Inventory > Price list, configure test pricing codes, base client costs, tax rules, and volume discounts. These settings feed into the Job Pulse module to generate accurate cost estimates for clients.

16.3 Currency Conversions (Live & Database)

To support multi-currency invoicing, GPhMLIMS integrates a currency rate service. It pulls live exchange rates directly from the Frankfurter API (<https://frankfurter.dev>) based on European Central Bank reference rates. Additionally, administrators can save static or contractual exchange rates in the database. The system automatically checks for database-saved rates first, falling back to live API rates.

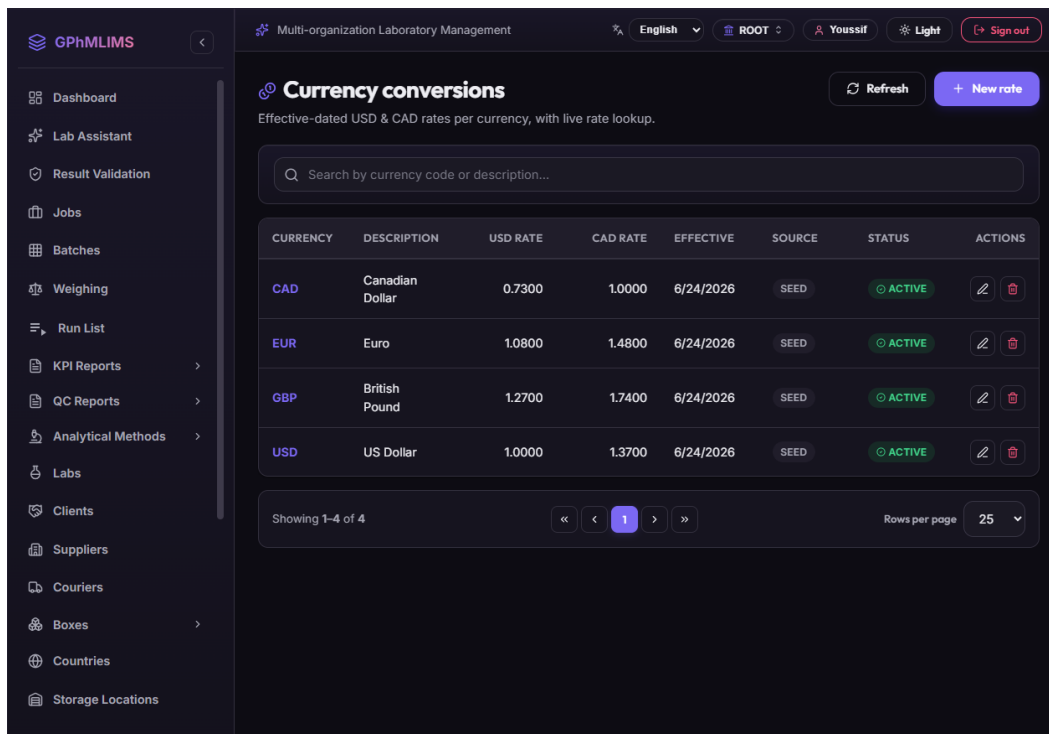


Figure 23: Currency Conversions settings and live rate panel

17. Search, Filter, & Box Trace Chain-of-Custody

Locating data quickly is vital. GPhMLIMS provides specialized search tools:

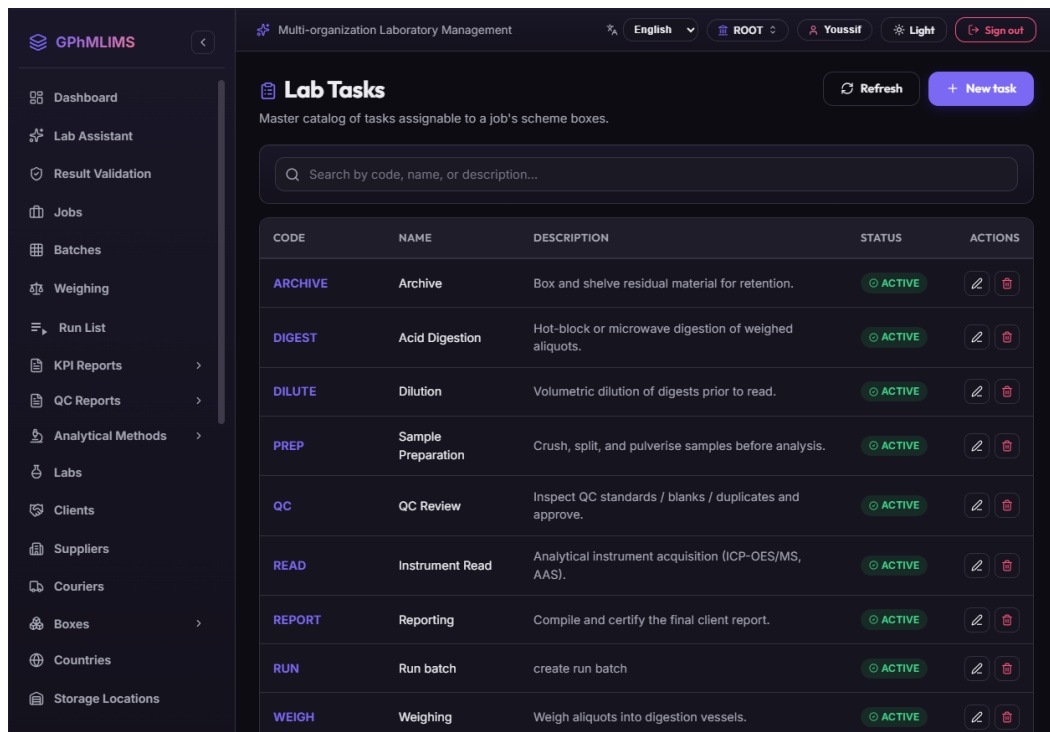
- **Global Search:** Located in the top header. Allows you to search by Job Code or Client Name from anywhere in the application.
- **Jobs Filter Grid:** On the Jobs page, filter jobs by status, lab, registered dates, or project code.
- **Box Trace:** Go to Boxes > Box Trace and scan or enter a Box Code. The page displays the box's current warehouse coordinates, custody log, active shipment records, and a list of all samples packed inside.

18. Notifications, Tasks, & Alarms

GPhMLIMS uses system alerts to guide daily tasks and flag warnings. **Alarm Alerts:** Displayed in the header notification bell. Flags overdue jobs, temperature out-of-bounds warnings, or unvalidated batches. **Lab Tasks:** Accessible under Configurations > Lab Tasks. Displays a prioritized list of activities assigned to your active lab location (e.g. 'Weigh 40 core samples', 'Dispatch 2 boxes to Vancouver lab').

18.3 Lab Tasks Queue

Technicians can view their daily work queue under Configurations > Lab Tasks. It shows prioritized activities (e.g. sample weighing, logging, or packaging) assigned to their branch. Technicians can mark tasks as 'In Progress' or 'Completed' directly from the grid.



CODE	NAME	DESCRIPTION	STATUS	ACTIONS
ARCHIVE	Archive	Box and shelve residual material for retention.	ACTIVE	 
DIGEST	Acid Digestion	Hot-block or microwave digestion of weighed aliquots.	ACTIVE	 
DILUTE	Dilution	Volumetric dilution of digests prior to read.	ACTIVE	 
PREP	Sample Preparation	Crush, split, and pulverise samples before analysis.	ACTIVE	 
QC	QC Review	Inspect QC standards / blanks / duplicates and approve.	ACTIVE	 
READ	Instrument Read	Analytical instrument acquisition (ICP-OES/MS, AAS).	ACTIVE	 
REPORT	Reporting	Compile and certify the final client report.	ACTIVE	 
RUN	Run batch	create run batch	ACTIVE	 
WEIGH	Weighing	Weigh aliquots into digestion vessels.	ACTIVE	 

Figure 24: Lab Tasks list showing operational queue

19. Master Settings & Configuration Tabs

The Configurations group in the sidebar contains tables for setup settings. These must be configured by administrators before starting operations:

19.1 Address & Geographics Configuration

Under Countries and Addresses in the sidebar, administrators can set up client billing addresses, geographic regions, courier hubs, and lab physical locations.

19.2 Local Printer & Barcode Setup

GPhMLIMS routes physical print jobs through a dedicated local printer agent utility (GPhMLIMSLocalPrinter) installed on the client workstation. This utility bridges the web application with local thermal and paper printers, enabling powerful print capabilities:

- Bulk Label Printing: The agent allows technicians to print thousands of box or sample barcode labels in a single click without browser dialog interruptions. It sends raw printer

commands (ZPL/EPL) directly to thermal label printers, ensuring high speed and perfect print alignment for high-throughput labs.

- **HTML-Based Document Printing:** In addition to raw barcode labels, the agent can compile dynamic HTML pages and send them to local paper printers. This HTML printing system is utilized for generating and printing high-fidelity Invoices and Quotations directly from the billing and sales wizard interfaces.
- **Configuration and Diagnostics:** Users configure their local printer settings, set their default paper sizes, and execute diagnostic print jobs via the 'Printer Settings' tab in their Account page.

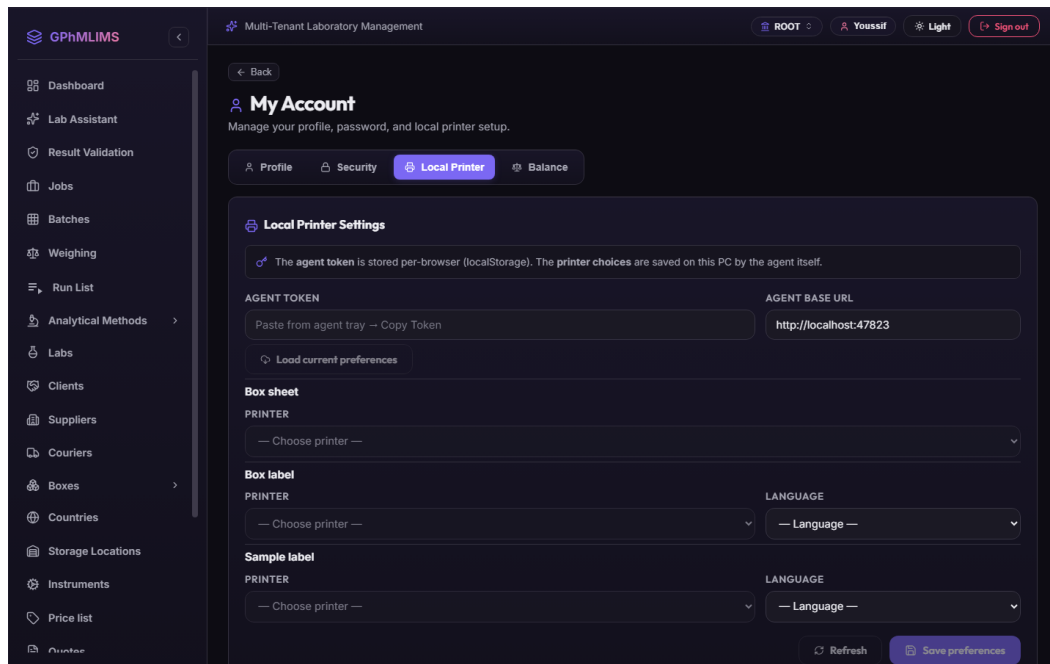


Figure 25: Raw Barcode and Label Printer settings page

19.3 Balance Capture Integration Settings

GPhMLIMS integrates directly with laboratory weighing balances to automatically capture sample weights, reducing human data-entry errors. The balance capture engine operates in a dual-connectivity mode to support any browser environment:

- **Browser-Direct Web Serial API:** If technicians run the web application using Google Chrome or Microsoft Edge, they can connect directly to their physical balance via the serial port. The application utilizes the native HTML5 Web Serial API to communicate directly with COM ports, reading weights in real-time as samples are placed on the scale.
- **Local Agent Fallback:** If technicians use alternative browsers that do not support the Web Serial API (such as Firefox or Safari), they can route balance communication through the GPhMLIMS local printer agent. The local agent handles the serial port connection on the client OS and relays the captured weight readings back to the web application over a secure local websocket connection.

- **Connection Tuning:** Under 'Balance Settings' on the Account page, technicians configure the connection details, including selecting the COM port, baud rate (e.g., 9600), data bits, parity, stop bits, and data triggers (such as stable weight thresholds), ensuring compatibility with all major laboratory balance brands.

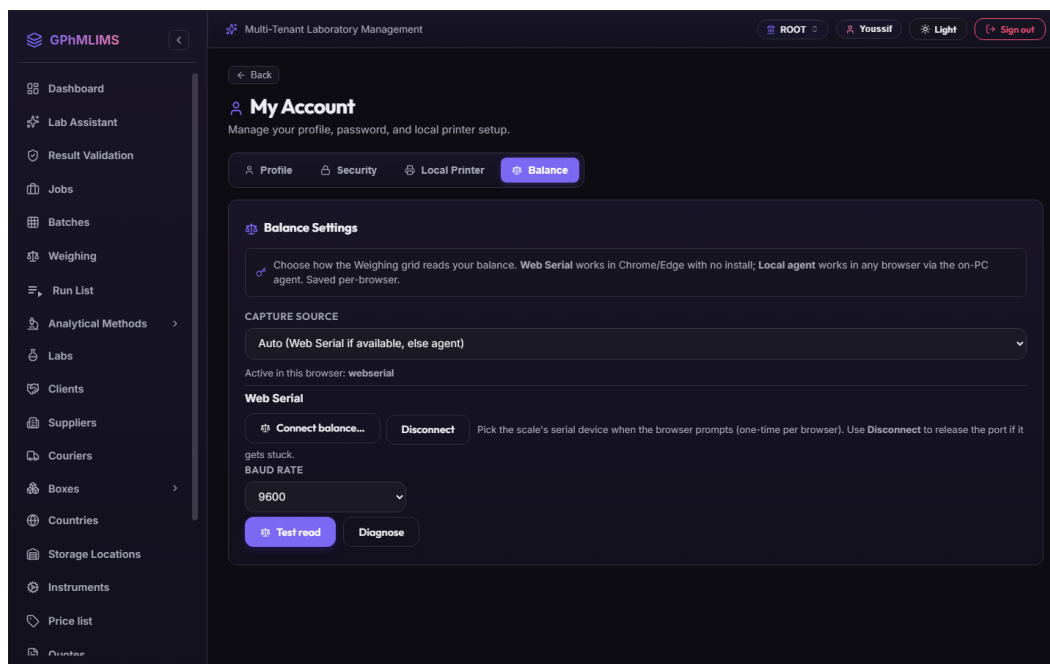


Figure 26: Lab Balance integration and serial connection settings page

20. Validation and Unvalidation Protocols

To preserve data integrity and prevent unauthorized modifications to laboratory results, GPhMLIMS utilizes a multi-tiered validation workflow:

- **Sample Validation:** Analysts finalize individual sample results in the Batch Results grid. Once validated, editing on that row is locked. Unvalidating the sample reverts it to Draft status.
- **Batch Validation:** committing a batch pushes all finalized sample results to core Job tables, locking the batch. The batch must be unvalidated first to clear/re-enter values.
- **Scheme Jobs Validation:** Finalizing an analytical scheme on a job freezes its pricing, analytes, and billing configurations.
- **Job Validation:** Freezes the entire Job Profile. A Job can only be validated once all associated schemes have been validated. Job validation blocks all edits and rebatches.
- **Run List Rollback/Clear:** Allows coordinators to input a Run Number to clear assignments and reset associated box tasks back to uncompleted.
- **Procedure Validation:** Managed via reportactive and invoiceactive toggles inside the Procedures table.
- **Standards Validation:** Managed via isActive and expiration date controls.

20.1 Sample Rebatching & Dual-Result Validation

If a sample's initial test results fail QC validation (e.g., standard deviation violations or duplicate variance checks), the sample is flagged for re-weighing or re-testing, which places it into a new analytical batch (Rebatching).

- When validating rebatched samples, GPhMLIMS provides the validator with a side-by-side comparison of the original (old) result and the retested (new) result. If the validator does not accept the new result (for example, if the second test run experienced calibration issues), they have the option to reject the new value and select the old result to be saved as the official record.
- Roadmap - AI Automated Validation: This manual selection process is the foundation for an upcoming AI Validation Module. The goal of this module is to automatically validate rebatched results without human interaction. By evaluating calibration history, duplicate variance curves, and certified reference standards, the AI will determine the most accurate result. This automated module is currently under development and will be rolled out once additional computational resources are allocated.

21. AI Copilot: Lab Assistant

The GPhMLIMS platform features an integrated AI-powered Lab Assistant (available in the navigation sidebar as 'Lab Assistant' or via the '/assistant' route). Built on top of the Anthropic Claude API using an agentic loop with tool invocation, this feature allows laboratory technicians, managers, and administrators to interact with active laboratory data in plain English. The assistant never directly accesses the database; instead, it executes secure local API tools, ensuring strict compliance with multi-organization data boundaries.

Key capabilities of the Lab Assistant include: Search Clients & Suppliers (Retrieve client details, contact emails, phone numbers, or active labs by searching name fragments), Track Job Status & Metadata (Search job profiles by code (e.g., 'VAN26') to check registered dates, client names, order numbers, or projects), View Sample Registers (List all physical sample identifiers, weights, units, and sample types registered under a specific job), Audit Analyte Results (Query measured chemical/analyte values, detection limits, and upper bounds for any individual sample), and Deterministic Quality Audits (Request the assistant to run the validation engine to identify Out-of-Specification (OOS) breaches or Out-of-Trend (OOT) deviations).

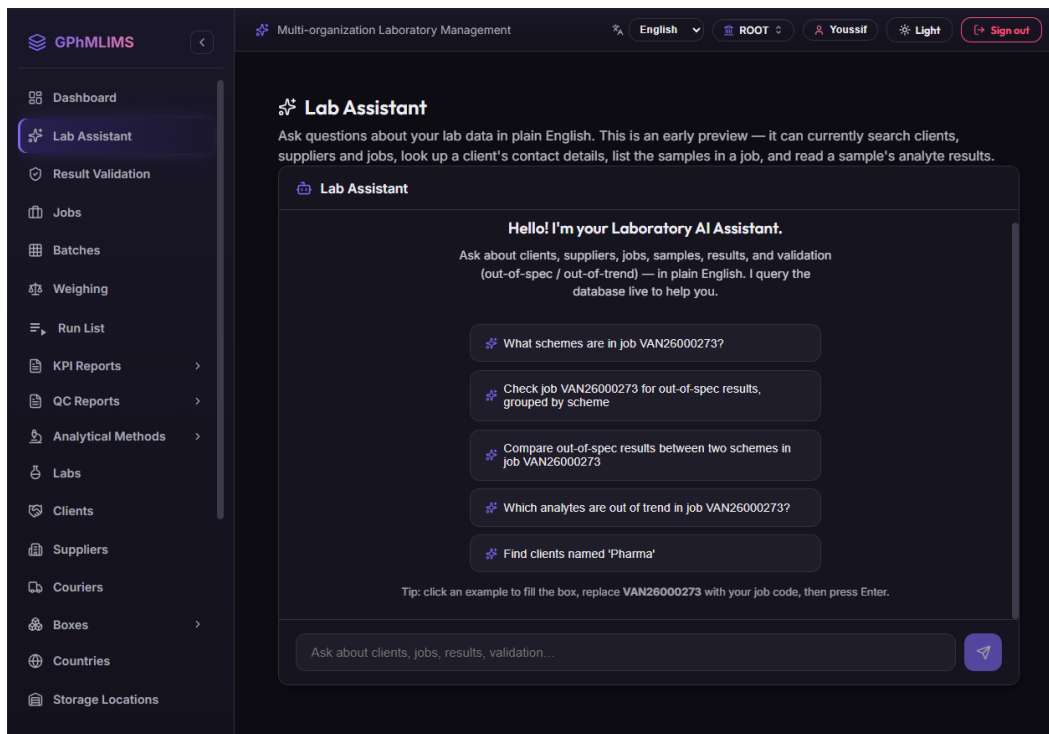


Figure 27: Lab Assistant (AI Copilot) panel showing natural language query execution

22. Multi-Organization Security & Role-Based Access Control

GPhMLIMS secures system resources across multiple organizations (tenants) using a strict, enterprise-grade role-based access control (RBAC) model. The system is engineered to be completely unbreakable and secure at its core, yet simple and intuitive for administrators without extensive IT experience to configure.

- **Data Isolation:** Enforced at the database level using Entity Framework Core Global Query Filters on 'TenantId' (Organization ID). Every database query automatically appends a filter ensuring that no user, regardless of request type, can ever fetch, modify, or leak data belonging to another organization. This database-level encapsulation makes it mathematically and logically impossible to break cross-organization boundaries.
- **Organization Identification:** Organizations are resolved dynamically on each request via HTTP headers, claims, or hostname strategies. If a request does not contain a cryptographically signed claim matching the target organization, the system blocks the connection immediately.

22.1 Assigning Roles & Permissions

Permissions are claim-based, but administrators do not need technical expertise to manage them. In the 'System Access' panel, administrators assign roles (such as Lab Manager, Analyst, or billing accounts) to users. Configuring a role's capabilities is as simple as checking or

unchecking permission flags (e.g., `Permission.Clients.Read`, `Permission.ProfJobs.Write`) on a clear, interactive matrix grid. The ASP.NET Core backend intercepts every interface click and API call, applying custom policy checks to prevent unauthorized actions.

22.2 Multi-Organization Access & Cross-Org Roles

A single user account can belong to multiple organizations (tenants) simultaneously, but their security profile remains fully isolated within each organization's context:

- **Multi-Organization Sign-In:** When logging into the system, the user specifies the Organization Code (e.g., 'org1' or 'org2') along with their credentials. Upon successful authentication, they receive a JWT token containing claims specific only to that organization session.
- **Independent Roles per Organization:** The same user account can have completely different roles in different organizations. For example, a user may be registered as an 'Administrator' in Organization A (giving them full access to users, roles, and settings), but only have a 'Read-Only Analyst' or 'Guest' role in Organization B (restricting them from registering jobs, modifying weights, or validating results).
- **Absolute Isolation (No Cross-Organization Leaks):** Because permissions and Organization IDs are cryptographically baked into separate session tokens, there is no crossover. A user acting within Organization A cannot access Organization B's data without signing out and logging into Organization B, which generates a brand-new distinct JWT containing only Organization B's organization claims. This prevents accidental data leaks or unauthorized cross-organization elevation of privilege.

23. Multilingual Interface & Localization

GPhMLIMS ships with a fully multilingual user interface so laboratory staff can operate the system in their preferred language. Every operational screen — dashboards, job and batch editors, wizards, dialogs, list grids, navigation menus, and system messages — is translated, covering more than 2,150 interface strings per language. The interface is currently available in four languages: English, Spanish (Español), Arabic (العربية), and French (Français). Arabic is presented in a complete right-to-left (RTL) layout. This localization support extends to all report modules, including the KPI Reports and QC Reports, ensuring headers, tables, summaries, and alerts are fully localized.

23.1 Switching the Interface Language

A language selector is located in the Top Utility Bar at the top-right of the application shell, alongside the theme toggle and user profile controls. Click the language button to open the list of available languages and choose one: English, Español, العربية (Arabic, rendered RTL), or Français. The interface updates instantly.

23.2 Right-to-Left (RTL) Layout for Arabic

When Arabic is selected, GPhMLIMS automatically switches the entire workspace to a right-to-left orientation. The navigation sidebar moves to the right-hand side; tables, forms, and toolbars mirror their alignment; and text flows from right to left. Numeric values, sample codes, and instrument readings remain in their standard left-to-right form for readability.

23.3 Saved Language Preference

Your chosen language is stored against your user profile and is remembered the next time you sign in. GPhMLIMS determines which language to display using: Saved profile preference, Browser language, and English as the default fallback.

23.4 Translation Scope & Fallback

All interactive modules of the application are fully translated across the four supported languages. Where an individual string has not yet been translated for a given language, GPhMLIMS automatically falls back to the English text, ensuring no screen is ever left blank or partially rendered.

24. FAQs & Troubleshooting Guidelines

Q: I get a 'String or binary data would be truncated' error when saving a job.

A: This indicates a database column constraint mismatch. In earlier migrations, the ProfJobCode field was restricted to 15 characters, but temporary internal job codes (e.g. VANTEMPou126000270) require 18 characters. Make sure to apply the database migration 20260621011237_IncreaseProfJobCodeLength which alters the database column to nvarchar(50).

Q: The Job Editor says 'Locked by user X' and I cannot make changes.

A: GPhMLIMS locks jobs to prevent concurrent overwrites. If user X has finished editing but didn't close their browser tab, wait 30 minutes for the lock to automatically expire, or ask an administrator to click the 'Unlock' button on the Jobs list page.

Q: Where is my local printer configured?

A: Navigate to your Account page by clicking your user profile chip. In the 'Printer Settings' section, you can select your barcode/label printer and test print a sample layout.

Q: I am trying to seed a new Lab sequence, but it gives a duplicate key error.

A: The Uniquenos table uses a composite primary key consisting of Seqcode (usually the Lab Code) and Seqtype (e.g., JOB or TEMP). You cannot have more than one row with the same combination. Edit the existing record instead of trying to add a new one.

25. KPI & QC Reporting Modules

GPhMLIMS features a comprehensive suite of reporting modules categorized into Key Performance Indicators (KPI) and Quality Control (QC) analytics. These reports help laboratory managers and technicians monitor throughput, verify precision, and analyze bottlenecks.

25.1 Quality Control (QC) Reports

- Duplicate QC Report: Compares results between primary samples and duplicate QC insertions, plotting variances.
- Named Standard QC Report: Traces the performance of specific certified standards over time against their certified target values.
- Preparation QC Report: Evaluates sample preparation stages (crushing and pulverizing) to identify contamination.
- Replicate QC Report: Details repeat measurements of the same sample containers to calculate reproducibility.
- Standard Weight QC Report: Validates that standard weights are within acceptable tolerance limits.

25.2 Key Performance Indicator (KPI) Reports

- Analysis & Reweighs Report: Tracks the count of sample reweighs and repeats, highlighting potential sample handling issues.
- Distribution List & Turnaround Report: Reports sample distribution times across different lab sections and tracks overall turnaround times.
- Job Turnaround Report: Measures the elapsed time from job creation to final result validation, tracking client-level service agreements (SLAs).
- Samples by Origin: Displays sample counts grouped by geological origin or source.
- Scheme Turnaround Report: Compares processing times between different analytical schemes to find bottlenecks.
- Top Clients List: Summarizes job volumes and revenue contribution by client.
- Work in Progress (WIP) Report: Lists all active batches and samples currently in the pipeline, showing their current workflow status.

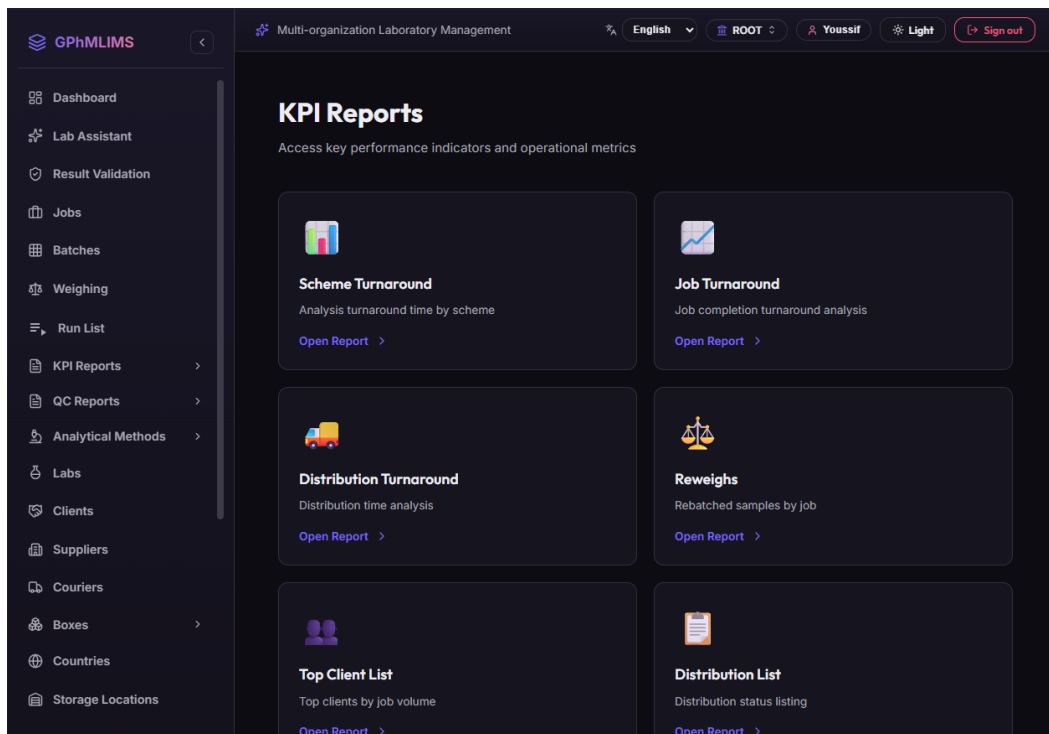


Figure 28: Reports Dashboard showing active KPI and QC analysis directories

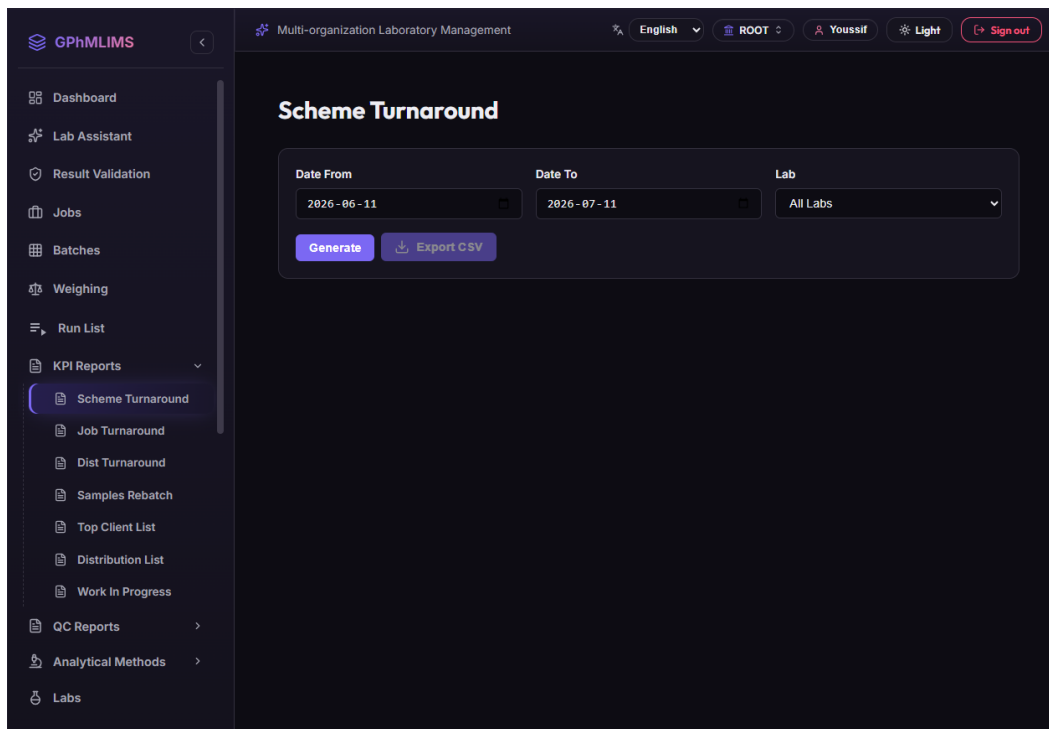


Figure 29: Analytical Schemes processing turnaround time bar chart

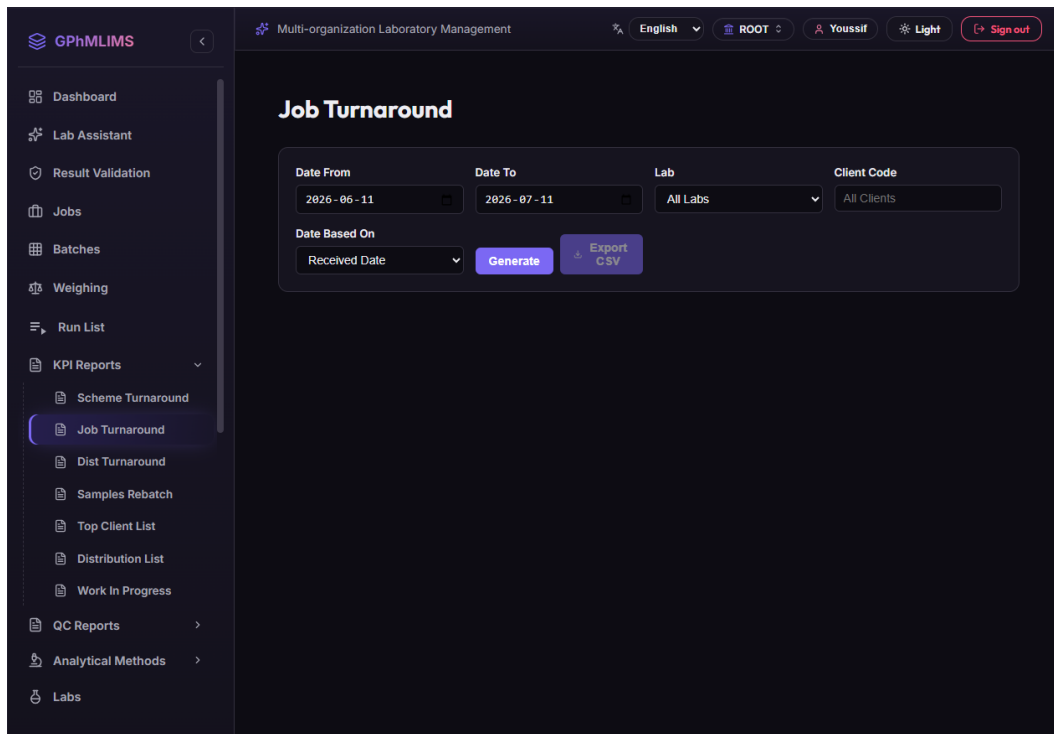


Figure 30: Job SLA turnaround time performance summary

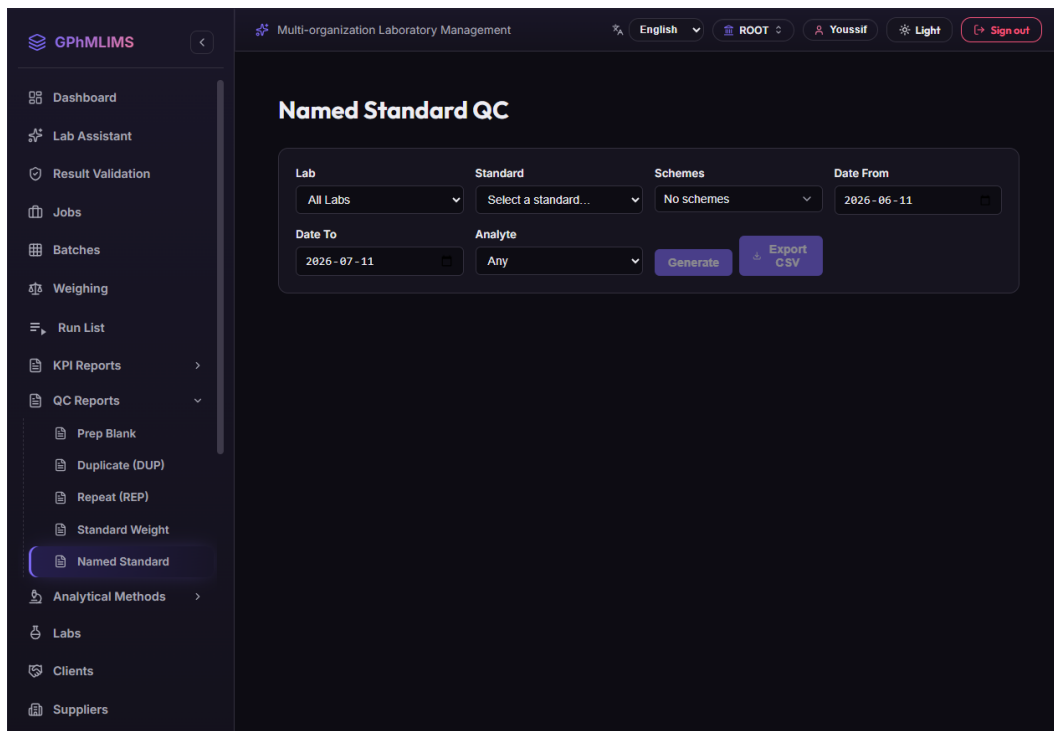


Figure 31: Certified Reference Materials named standards control chart

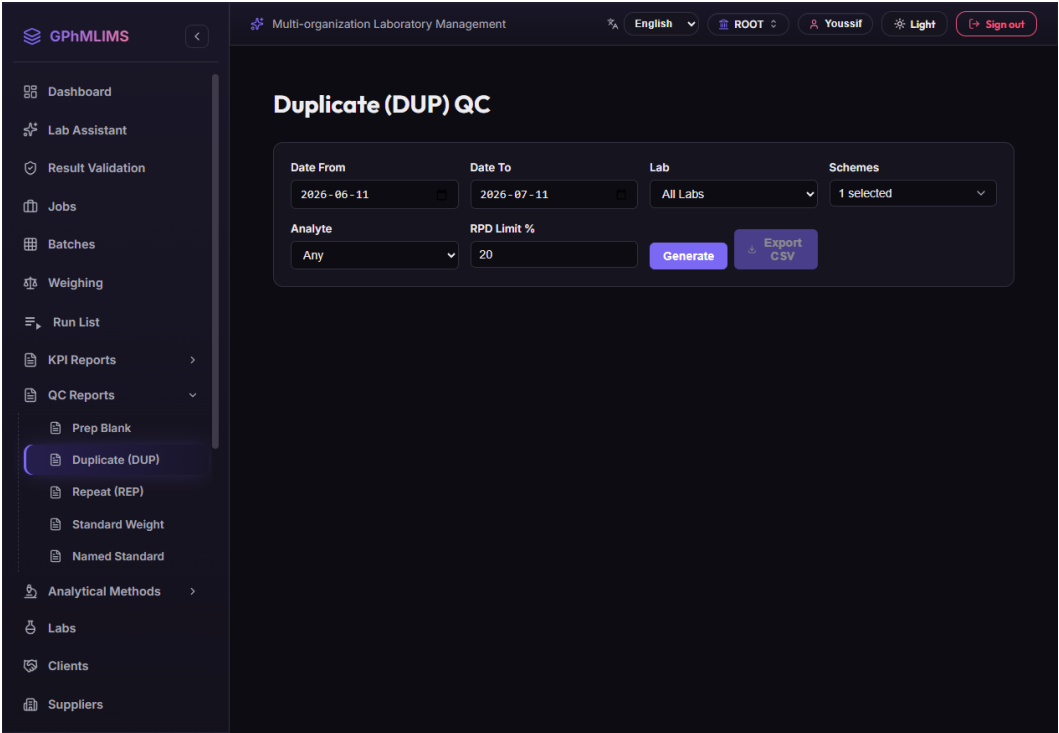


Figure 32: Duplicates analytical precision scatter plot

Appendix: Tables and Configurations

System Access & Navigation Pages

Nav Group	Main Pages Included	Permissions Required
Dashboard & Jobs	Dashboard (Home), Jobs list, Job Editor	Permission.ProfJobs.Read / Write
Batches & Runs	Batches, New Batch page, Run Lists, Batch Results	Permission.Batches.Read / Write, Permission.RunList.Read
Analytical Methods	Batch QC Config, Procedures, Schemes, Analytes, Units	Permission.Procedures.Read, Permission.Schemes.Read
Boxes & Transfer	Box Shipments, Assign Box Location, Box Trace	Permission.BoxShipments.Read, Permission.BoxMovements.Create
System Access	Users list, User Roles page, Multi-Organization management	Permission.Users.Read, Permission.Roles.Read
Configurations	Sample Types, Taxes, Unique Sequences, Lab Tasks, Standards	Permission.SampleTypes.Read, Permission.Taxes.Read

Master Settings & Tabs Description

Configuration Tab	Purpose	Key Inputs Required
Sample Types	Defines physical states of samples.	Type Code, Description, Core/Reject flag
Taxes	Sets tax percentages per region.	Tax Name, Rate (%), Region Code
Units of Measure	Standardizes analytical weight/volume.	Unit Code (g, kg, ml), Conversion factor
Status Codes	Custom status progression workflow.	Status Number, Status Color, Description
Containers	Defines box/bag volumes.	Container Code, Capacity, Tare Weight
Unique Sequences	Stores integer seeds for job codes.	Seqcode (LabCode), Seqtype (JOB/TEMP), LastNoUsed
Standards	Certified Reference Materials for QCs.	Standard Name, Analyte expected values, Std dev