Centralized Ledger

1. Overview

The **Centralized Ledger** in BAT Connect is the authoritative financial engine that consolidates **all operational and financial transactions** tied to drivers, vehicles, and medallions.

It captures both:

- **Earnings** (CURB credit card fares, net of taxes/surcharges).
- **Obligations** (lease fees, repairs, loans, tolls, tickets, taxes, misc).

This ensures that **every dollar earned or owed through BAT systems** is reconciled through a single source of truth.

Key Objectives

1. **Unify All Financial Obligations and Earnings**
   - Consolidates obligations from all source systems:
     - **Lease Schedules**
     - **Repairs (Invoices & Installments)**
     - **Driver Loans**
     - **EZPass Tolls**
     - **PVB Tickets**
     - **TLC Tickets**
     - **Taxes & Fees (MTA, TIF, Congestion, CBDT, Airport Fees)**
     - **Miscellaneous Charges** (true one-off items like admin fees, car wash, etc.)
   - Consolidates earnings from:
     - **CURB Credit Card Fares (directly deposited into BAT's account)**
     - **Net of trip-level taxes and surcharges**
2. **Support All Payment and Correction Types**
   - **Earnings application** – weekly allocation of CURB fares against obligations.
   - **Scheduled installments** – system-generated for loans, leases, repairs.
   - **Interim payments** – ad-hoc driver payments outside the DTR cycle (cash, check, ACH).

- **Corrections via Reversal & Reposting** – no entry is ever edited; errors are corrected by voiding or reversing the incorrect entry and reposting under the appropriate category.

3. **Provide Real-Time Balances**
   - **Ledger_Balances** always reflects the net position:
     - (Outstanding Obligations – Payments – Allocated Earnings).
   - Obligations remain open until fully settled; partial payments reduce balances progressively.

4. **Serve as the Foundation for DTRs**
   - DTRs are snapshots of **Ledger_Balances** at weekly cut-off (Sunday 05:00 AM).
   - Ensures drivers see both **earnings and deductions** reconciled into Net Earnings.
   - Guarantees payouts (ACH or check) match exactly with ledger balances.

Business Benefit

By centralizing all **earnings and obligations**, BAT achieves:

- **Transparency** → Drivers see clearly what they earned and how deductions were applied.
- **Control** → Operations ensure a strict payment hierarchy (Taxes → Lease → Repairs/Loans, etc.).
- **Auditability** → All activity remains immutable, with corrections only via reversal and reposting.
- **Reconciliation-readiness** → Finance and operations can always reconcile ledger balances with DTRs and external systems (QuickBooks, audits).

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2. Key Principles

The Centralized Ledger follows a strict set of principles to ensure consistency, auditability, and reconciliation across all driver, vehicle, and medallion obligations.

2.1 Single Source of Truth

- All financial activity flows into the ledger.
- No balances are tracked outside the ledger — the ledger is the **authoritative record**.
- DTRs and all financial reports are derived directly from the ledger.

2.2 Immutable Entries

- Once posted, ledger entries cannot be edited or deleted.
- Corrections are performed through:
  - **Voiding/Reversals** (negating the original entry).

- **Reposting** under the correct category.
- This guarantees a full, auditable trail of every transaction.

2.3 Multi-Entity Linkage

- Every ledger entry may reference one or more entities:
  - **Driver**
  - **Vehicle**
  - **Medallion**
- This allows a single posting (e.g., a lease fee) to be viewed across all relevant dimensions.
- Sub-ledgers (Driver Ledger, Vehicle Ledger, Medallion Ledger) are **reporting views**, not separate systems.

2.4 Event-Based Posting

- Entries are created based on **source system events**:
  - Lease schedules, repair invoices, loan issuances, CURB credit card earnings, EZPass/PVB/TLC imports, interim payments.
- Each event produces a normalized posting that flows into the ledger.

2.5 Reconciliation-Driven Design

- Balances must always reconcile to:

```
Outstanding = Source Obligation – (Sum of Ledger_Postings)
```

- Subtotals in DTRs must reconcile with detailed ledger entries.
- No manual overrides are allowed without ledger postings.

2.6 Hierarchical Allocation

- **Weekly earnings** are applied to obligations in a strict category hierarchy:
  Taxes → EZPass → Lease → PVB → TLC → Repairs → Loans → Misc.
- Within each category, allocations follow a **chronological rule** (oldest balances first).
- **Interim Payments** are the only exception — they bypass the hierarchy and are applied directly to obligations selected by BAT staff at the time of payment.

2.7 Extensibility

- New obligation or earning types can be added with minimal change to the ledger design.
- Posting categories are standardized, but the model supports future integrations (e.g., insurance, new regulatory fees).

3. Ledger Data Model

The Centralized Ledger consists of two core tables:

1. **Ledger_Postings** – immutable record of every financial transaction (earnings, obligations, payments, reversals).
2. **Ledger_Balances** – rolling outstanding balance for each obligation, updated automatically as payments and allocations are applied.

All reporting (DTRs, receipts, reconciliation) is derived directly from these two tables.

3.1 Ledger_Postings

Purpose: Records every financial event in BAT Connect at the most granular level.
Each posting updates **Ledger_Balances** in real time.

Fields & Rules

Field	Description	Rules
Posting_ID	Unique identifier	System-generated UUID
Category	Obligation or earning type (Lease, Repair, Loan, EZPass, PVB, TLC, Taxes, Misc, Earnings, Interim Payment)	Must always map to a defined category
Amount	Dollar value of posting	Positive = debit (obligation), Negative = credit (earning/payment)
Entry_Type	DEBIT (obligation) / CREDIT (earning or payment)	Immutable once posted
Driver_ID	Driver reference	Mandatory if driver-related

Vehicle_ID	Vehicle reference	Mandatory if vehicle-related
VIN	Vehicle VIN	Stored for filtering / reconciliation
Plate	Vehicle Plate	Stored for filtering / reconciliation
Medallion_ID	Medallion reference	Mandatory if medallion-related
Lease_ID	Lease reference	Required if linked to a lease
Reference_ID	Source record ID (Lease ID, Repair Invoice ID, Loan ID, Trip ID, etc.)	Provides traceability to source tables
Status	POSTED, VOIDED	VOIDED = neutralized by automatic reversal entry
Posted_On	Timestamp	Immutable audit trail
Posted_By	User/system posting the entry	Mandatory

Rules

- One posting per event (e.g., 10 EZPass tolls = 10 postings).
- No edits or deletes; voiding creates a reversal entry.
- Errors must be handled upstream, never posted into the ledger.

3.2 Ledger_Balances

Purpose: Rolling snapshot of each obligation until cleared.

Balances remain OPEN until fully settled, at which point they are CLOSED.

Fields & Rules

Field	Description	Rules
Balance_ID	Unique identifier	System-generated
Category	Obligation type (Lease, Repair, Loan, EZPass, PVB, TLC, Taxes, Misc)	Matches Ledger_Postings Category
Driver_ID	Driver reference	Required for driver-level balances
Vehicle_ID	Vehicle reference	Required if linked to a vehicle
VIN	Vehicle VIN	Stored for filtering / reconciliation
Plate	Vehicle Plate	Stored for filtering / reconciliation
Medallion_ID	Medallion reference	Required if linked to medallion
Lease_ID	Lease reference	Required if linked to lease
Reference_ID	Source obligation (Repair Invoice ID, Loan ID, Toll ID, Ticket ID, etc.)	Always traceable to original record
Original_Amount	Total obligation from source	Immutable
Prior_Balance	Carried over unpaid portion from previous cycle(s)	Updated each DTR cycle
Payment	Amount settled this cycle	Links to Applied_Payment_Refs
Balance	Remaining unpaid portion	Updated after each payment/allocation

Applied_Payment_Refs	References to payment(s) applied (Interim Payment ID, Earnings Batch ID, etc.)	Supports multiple refs if needed
Status	OPEN, CLOSED	CLOSED when Balance = 0
Updated_On	Timestamp of last update	System-managed

Rules

- One balance line per obligation (Reference_ID).
- If multiple payments reduce a balance, each is tracked via Applied_Payment_Refs.
- Balance = Original_Amount – (Sum of Payments).
- Once Balance = 0, line is marked CLOSED but retained for audit.

3.3 Relationships

- **Source Tables → Ledger_Postings**
  - Lease Schedule, Repair Invoices, Loan Records, EZPass CSVs, PVB Tickets, TLC Violations, CURB Trip Data.
  - Each obligation/earning event creates one posting.
- **Ledger_Postings → Ledger_Balances**
  - Postings update balances by Reference_ID.
  - Balances show how much remains outstanding, original obligation, payments made, and prior balances.
- **Ledger_Balances → DTRs**
  - Weekly DTRs are snapshots of Ledger_Balances at cut-off (Sunday 05:00 AM).
  - Each line in a DTR (Lease, Repair, Loan, EZPass, PVB, TLC, Misc) corresponds to one or more balance records.

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4. Posting Logic

The Centralized Ledger operates on an **event-based posting model**:

- Every obligation, earning, or payment event creates a posting in **Ledger_Postings**.

- Each posting updates the related obligation in **Ledger_Balances**.
- Balances remain OPEN until the obligation is fully cleared.

4.1 Obligation Creation

- When a new obligation is created in a source system, a **debit posting** is recorded.
- Ledger_Balances opens a new line for that obligation.
- Examples:
  - **Lease Schedule** → weekly lease fee posting.
  - **Repair Invoice** → invoice amount, with repayment installments scheduled.
  - **Loan Issuance** → loan principal amount.
  - **EZPass CSV Upload** → toll event.
  - **PVB/TLC Tickets** → violation posting.
  - **Taxes & Fees** → trip-level surcharges from CURB.

4.2 Earnings Allocation

- Weekly CURB **credit card earnings** are posted as **credits**.
- Earnings are applied to outstanding balances in strict priority:
  a. Taxes
  b. EZPass
  c. Lease
  d. PVB
  e. TLC
  f. Repairs
  g. Loans
  h. Miscellaneous
- Within each category, earnings are applied **chronologically (oldest first)**.
- Allocations generate postings that reduce balances.
- Any unallocated remainder is recorded as **Net Earnings → Driver Payout**.

4.3 Scheduled Installments

- For **Loans** and **Repairs**, obligations are split into installments via repayment matrices.

- Each installment is posted as a **debit** into Ledger_Balances.
- When applied earnings or interim payments reduce the installment, the balance updates.
- Balance is marked CLOSED once the installment is fully paid.

4.4 Interim Payments

- Drivers may make ad-hoc payments (cash, check, ACH) at the cashier desk.
- These create **credit postings** in Ledger_Postings.
- Interim Payments bypass the earnings hierarchy:
  - Staff manually select which obligations are reduced.
  - Allocations create direct links from the Interim_Payment_ID to the affected Balance_IDs.
- Remaining balance is updated immediately.
- Drivers receive a **separate interim receipt**.

4.5 Reversals (Voids)

- Ledger entries cannot be edited or deleted.
- To void an entry:
  - A **reversal posting** is created (same references, opposite amount).
  - Original posting is marked **VOIDED**.
  - Balance is adjusted accordingly.
- Example: A $200 Loan installment posted in error → Void creates a $200 CREDIT posting, neutralizing the balance.

4.6 Reconciliation Rules

- For every obligation:
```
Balance = Original_Amount − (Sum of Payments Applied)
```
- For every category in DTR:
```
Subtotal = Sum of Ledger_Balances (OPEN + CLOSED for the
period)
```
- Ledger_Balances must always reconcile with:
  - DTR line items.
  - Source tables (Lease, Repair, Loan, EZPass, PVB, TLC).

- Applied earnings and interim payments.

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5. Ledger Views

The Centralized Ledger provides a **single source of truth**.

Different stakeholders, however, require different perspectives — whether by **Driver**, **Vehicle**, or **Medallion**.

These are delivered through **Ledger Views**, which filter and pivot data from the same underlying tables (Ledger_Postings and Ledger_Balances).

5.1 Driver Ledger View

Purpose: Shows all earnings, obligations, and payments tied to a specific driver.

Includes:

- **Earnings:** CURB credit card earnings.
- **Lease obligations:** Weekly lease tied to the driver's active Lease_ID.
- **Repairs & Maintenance:** Repair installments passed down to driver.
- **Driver Loans:** Loan obligations with installment deductions.
- **EZPass Tolls:** Allocated by Hack License or lease vehicle.
- **PVB/TLC Tickets:** Violations tied to the driver.
- **Inspections:** TLC/DMV inspection charges, if passed on to the driver.
- **Taxes & Fees:** MTA, TIF, Congestion, CBDT, Airport fees.
- **Miscellaneous:** One-off charges (e.g., admin fees, chargebacks).
- **Interim Payments:** Cash/ACH/check payments made by the driver outside weekly earnings.

Used For:

- DTR generation (weekly).
- Driver statements and payout calculations.
- Dispute resolution and collections.

5.2 Vehicle Ledger View

Purpose: Tracks all earnings and obligations tied to a specific vehicle (VIN, Plate).

Includes:

- **Acquisition Cost:** Base cost of acquiring the vehicle.

- **Hackup Cost:** Cost of making the vehicle TLC-compliant.
- **Lease Collected:** Lease revenue linked to the vehicle.
- **Repairs & Maintenance:** Repair invoices/installments.
- **EZPass Tolls:** Toll events tied to the vehicle Plate.
- **PVB/TLC Tickets:** Violations tied to the vehicle.
- **Inspections:** TLC/DMV inspection costs tied to the vehicle.
- **Insurance (if tracked):** Costs or claims tied to the vehicle.

Used For:

- Fleet operations reporting.
- Vehicle profitability analysis (cost vs revenue).
- Maintenance planning and compliance tracking.

5.3 Medallion Ledger View

Purpose: Tracks all earnings and obligations tied to a specific medallion.

Includes:

- **Royalty Payments:** Periodic medallion royalty charges.
- **Lease Collected:** Lease revenue tied to the medallion.
- **PVB/TLC Tickets:** Violations tied to the medallion (separate from driver).
- **Taxes & Fees:** Medallion-level fees, if directly assessed.
- **Other Medallion Charges:** Compliance or ownership-related fees.

Used For:

- Medallion ownership reporting.
- Medallion profitability and ROI tracking.
- Compliance/audit reports for regulatory agencies.

5.4 How Views Work

- All views are **derived from the same Centralized Ledger**.
- **Driver Ledger** pivots on **Driver_ID / Hack License**.
- **Vehicle Ledger** pivots on **Vehicle_ID / VIN / Plate**.
- **Medallion Ledger** pivots on **Medallion_ID**.

- Each perspective shows a **different slice of the same postings and balances**, ensuring one unified truth.

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6. Lifecycle & Reconciliation

The Centralized Ledger enforces consistent lifecycles for both **balances** and **entries**, ensuring obligations are tracked from creation to closure, with full reconciliation across DTRs, interim payments, and finance.

6.1 Balance Lifecycle (Ledger_Balances)

1. **Creation (OPEN)**
   - Obligation is created from a source system (Lease Schedule, Repair Invoice, Loan Issuance, EZPass Toll, TLC Ticket, etc.).
   - A **debit posting** is recorded in Ledger_Postings.
   - Ledger_Balances opens a new line item with status **OPEN**.

2. **Reduction (PARTIAL)**
   - Payments (weekly CURB earnings or Interim Payments) create **credit postings**.
   - Credits are applied to the balance by rules:
     - Hierarchy (Taxes → EZPass → Lease → PVB → TLC → Repairs → Loans → Misc).
     - Chronology (oldest first).
     - Interim Payments (manual allocation by staff).
   - Balance reduces but remains **OPEN** until fully cleared.

3. **Closure (CLOSED)**
   - Once **Balance = 0**, the line item is marked **CLOSED**.
   - Obligation remains in the ledger permanently for audit.

4. **Voiding (VOIDED)**
   - If an obligation was posted in error, staff may trigger a **Void**.
   - System automatically posts a reversal entry.
   - Original balance is neutralized and marked **VOIDED**.

6.2 Ledger Entry Lifecycle (Ledger_Postings)

1. **Creation (POSTED)**

- Entry is created automatically from a source system or by staff action (Interim Payment, Void).
- Recorded in Ledger_Postings with status **POSTED**.
- Immediately updates the related Ledger_Balance(s).

2. **Application**
   - Entry applies instantly to Ledger_Balances (e.g., lease debit, CURB credit).
   - Some may apply as part of weekly batch (e.g., CURB earnings allocation).
   - Status remains **POSTED**, but with linkage to updated Balance_ID(s).

3. **Voiding (VOIDED)**
   - If an entry was incorrect, staff may void it.
   - System creates a **reversal posting** (opposite amount, same references).
   - The original entry is marked **VOIDED**.
   - Reversal entry is **POSTED** and applied to balances.

4. **Immutability**
   - No entry can be edited or deleted.
   - All corrections are handled through reversals and repostings.
   - Provides a permanent, auditable transaction trail.

6.3 Reconciliation Logic

- **For Each Obligation**

```
Balance = Original_Amount – (Sum of Payments Applied)
```

- **For Each DTR Line Item**

```
Category Total = Sum of Ledger_Balances for that category
(OPEN + CLOSED within the cycle)
```

- **For Net Earnings Calculation**

```
Net Earnings = Total CURB Earnings – Total Obligations
Deducted (per hierarchy)
```

- **For Interim Payments**
  - Interim Payments never appear as DTR line items.
  - Their effect is visible only as reduced balances in the ledger.
  - Interim Payment Receipts provide separate documentation.
- **System Reconciliation**

- Ledger must reconcile against:
    - **Source Tables** (Lease, Repair, Loan, EZPass, PVB, TLC, Taxes).
    - **DTR Snapshots** (weekly cut-off).
    - **Finance Exports** (QuickBooks, banking).

6.4 Carry-Forward Rules

- Any unpaid obligation at DTR cut-off remains **OPEN** in Ledger_Balances.
- Carried forward as **Prior Balance** in the next cycle.
- Appears in subsequent DTRs until cleared.
- Ensures multi-week obligations (e.g., loans, repairs) are tracked across cycles.

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7. Validation Rules

To ensure accuracy and auditability, the Centralized Ledger enforces strict validation rules at both the **posting** and **balance** level.

7.1 Posting-Level Validations (Ledger_Postings)

1. **Mandatory References**
    - Every posting must include a valid **Reference_ID** (Lease_ID, Repair Invoice_ID, Loan_ID, Trip_ID, etc.).
    - Driver_ID, Vehicle_ID, VIN/Plate, and Medallion_ID must be present where relevant.
2. **Category Integrity**
    - Posting must map to an approved category:
    Lease, Repair, Loan, EZPass, PVB, TLC, Taxes, Misc, Earnings, Interim Payment.
    - No "free-text" categories allowed.
3. **Entry Type Enforcement**
    - Debit = obligations (positive amount).
    - Credit = earnings or payments (negative amount).
    - Reversal = exact opposite of original posting.
4. **Immutability**
    - No edits or deletes once posted.
    - Corrections only via **Void (reversal entry)**.
5. **VIN/Plate Validation**

- Required for postings tied to vehicles (EZPass, Repairs, TLC inspections, Vehicle Lease, etc.).
- VIN and Plate must match an active vehicle record.

6. **Lease_ID Validation**
   - Required for all Lease-related postings (lease charges, driver lease earnings, medallion lease charges).
   - Lease_ID must be active and valid.

7.2 Balance-Level Validations (Ledger_Balances)

1. **Balance Consistency**
   - For each balance:
   ```
   Balance = Original_Amount – (Sum of Payments Applied)
   ```
   - No balance can drift outside this formula.

2. **No Negative Balances**
   - Balances cannot drop below 0.
   - Overpayment must roll into credit, posted separately (e.g., "Overpayment Adjustment").

3. **Prior Balance Carry-Forward**
   - Unpaid balances must always roll forward into the next cycle.
   - Prior_Balance must match the closing balance of the previous DTR.

4. **Closure Validation**
   - Balance may only be marked CLOSED when Balance = 0.
   - CLOSED balances remain in the ledger permanently (for audit).

5. **Applied Payment Reference Validation**
   - Every payment applied to a balance must reference its source:
     - **Interim Payment ID**, or
     - **Earnings Batch ID** (CURB weekly earnings).
   - Supports multiple references for multi-source payoffs.

7.3 Hierarchy & Allocation Rules

1. **Earnings Application Hierarchy**
   - Weekly CURB earnings must follow strict order:
   Taxes → EZPass → Lease → PVB → TLC → Repairs → Loans → Misc.

2. **Chronological Order**

- Within each category, oldest obligations are cleared first (FIFO).

3. **Interim Payments Exception**

   - Interim payments may be allocated manually by staff.
   - System must validate that the selected obligations are valid OPEN balances.

7.4 System-Level Validations

1. **Cut-Off Enforcement**

   - Weekly DTR snapshots must lock balances at Sunday 05:00 AM.
   - No postings can backdate into a closed DTR period.

2. **Reconciliation Check**

   - Sum of category totals in DTR must equal corresponding ledger balances.
   - Ledger must reconcile with source systems (Lease, Repairs, Loans, EZPass, etc.) and finance exports.

3. **Audit Trail Completeness**

   - Every posting must capture Posted_On and Posted_By.
   - Voided postings must retain full linkage to reversal entries.