Driver Loans

1. Overview

The **Driver Loans module** in BAT Connect manages the full lifecycle of personal loans extended to drivers by BAT.

Its purpose is to ensure that loan amounts are created, structured into manageable repayment schedules, and systematically reconciled through weekly DTRs.

Key Objectives:

1. **Loan Creation** – Allow BAT to create and store loan records directly in the system (no external invoice required).
2. **Payment Plan Creation** – Automatically generate a weekly repayment schedule using the **Loan Repayment Matrix** (same as Repairs).
3. **Interest Calculation** – Apply annual interest rates to loan balances. Default = 0% (for trusted, loyal drivers).
4. **Installment Deduction** – Deduct only the scheduled weekly installment from the driver's DTR.
5. **Balance Management** – Carry forward unpaid balances until the loan is fully settled.
6. **Driver Transparency** – Show only the weekly deduction in the driver-facing DTR, while BAT tracks full loan details (principal, interest, outstanding balance).

Business Benefit:

This enables BAT to provide financial support to drivers without disrupting their weekly cash flow, while ensuring loans are recovered in a structured and transparent manner.

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2. Fields & Rules

Loan Master

Field	Source / Entry	Description	Rules / Validation
Loan ID (Internal)	System-generated	Unique internal ID for loan record. Used as parent key for all installments.	Hidden from UI. Format: `DLN-YYYY-###`

Driver (Hack License)	BAT Connect (Driver records)	TLC license of driver receiving the loan.	Mandatory; must map to an active driver.
Medallion Number	BAT Connect (Lease records)	Medallion associated with the driver/lease (for context).	Optional; linked if driver is on an active lease.
Loan Amount (Principal)	Manual entry	Total principal amount disbursed to driver.	Must be ≥ $1.
Interest Rate (Annual %)	Manual entry (default 0%)	Annual interest rate to be applied on loan balance.	Entered as percentage (e.g., 10 = 10%). Must be divided by 100 in system logic. Default = 0%; Max = 20%.
Start Week	Dropdown	Determines when repayment starts.	Values: *Current Payment Period* or *Next Payment Period*.
Purpose / Notes	Free-text	Reason for loan (e.g., injury, education, family).	Max 250 chars.
Status	System-calculated	Lifecycle state of the loan.	Values: Draft / Open / Closed / Hold / Cancelled.
Created By / Timestamp	System-generated	User and timestamp of creation.	Audit field.
Updated By / Timestamp	System-generated	User and timestamp of update.	Audit field.

Loan Schedule

Field	Source / Entry	Description	Rules / Validation
Installment ID	System-generated	Unique identifier for each installment.	Format: `[LoanID]-`

			`[Seq]` (e.g., DLN-2025-045-02).
Week Start Date	System-calculated	Start date of the payment period.	Always Sunday 00:00:00.
Week End Date	System-calculated	End date of the payment period.	Always Saturday 23:59:59.
Principal Amount	System-calculated	Weekly principal portion from Loan Repayment Matrix.	Fixed based on loan size bracket.
Interest Amount	System-calculated	Interest accrued on outstanding principal for the accrual days.	Formula: `Outstanding Principal × (Annual % ÷ 100) × (Accrual Days ÷ 365)`.
Total Due (This Period)	System-calculated	Principal + Interest for this installment.	Posted to ledger on Sunday 05:00.
Prior Balance	System-populated	Remaining unpaid principal from earlier cycles.	Auto-carried forward.
Balance	System-calculated	Remaining unpaid principal after this installment.	Formula: Loan Amount – (Sum of Principal Paid).
Ledger Posting Ref	System-generated	Ledger entry ID created when installment is posted.	Null until posted.
Status	System-calculated	Lifecycle state of installment.	Values: Scheduled / Due / Posted / Paid.

3. States & Lifecycle – Driver Loans

The Driver Loans module tracks obligations at two levels:

1. **Loan (Master Record)** – the overall obligation created when a loan is disbursed.
2. **Loan Installments (Schedule Rows)** – the scheduled weekly deductions derived from the Loan.

3.1 Loan – States

State	Description	Transition Triggers
Draft	Loan created but not yet confirmed. Payment Schedule not generated.	User saves loan without confirming.
Open	Loan confirmed, Payment Schedule generated, installments scheduled.	Loan confirmed. Remains Open until balance = $0.
Closed	All installments fully posted and balance = $0.	Last installment posted, balance cleared.
Hold	Loan flagged for review (e.g., driver dispute, error in loan creation). Installment postings paused.	Manual action by BAT staff.
Cancelled	Loan voided before any installment postings occur.	Manual cancellation (only possible if no postings exist).

Lifecycle Path:
Draft → Open → (Hold) → Closed
↘ **Cancelled** (if voided before postings)

3.2 Loan Installments – States

State	Description	Transition Triggers
Scheduled	Installment generated but not yet due.	Payment Schedule creation.
Due	Installment's Payment Period has started (Sunday 00:00)	Time-based trigger at start of Payment Period.

	but not yet processed at 05:00 batch.	
Posted	Installment successfully posted to the Ledger at 05:00 AM Sunday batch.	System batch posting.
Paid (optional)	Installment reconciled as cleared in Ledger_Balances.	Ledger balance = 0 for this installment.

Lifecycle Path:
Scheduled → Due → Posted → Paid

3.3 Link Between Loan & Installments

- A Loan cannot be marked **Closed** until all associated Installments = Paid.
- If a Loan is put on **Hold**, all associated Installments remain in Scheduled/Due and do not move forward until the hold is lifted.
- Cancelled Loans automatically cancel all associated Installments (if none are Posted yet).

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4. Calculation Logic – Driver Loans

The Driver Loans module uses the same **Loan Repayment Matrix** as Repairs to determine the **weekly principal portion** of installments. Interest is then **calculated separately** and added on top of the principal.

Each installment therefore contains three components:

- **Principal Amount** – from the Loan Repayment Matrix.
- **Interest Amount** – based on outstanding principal and daily accrual.
- **Total Due** – Principal + Interest.

Installments are aligned with BAT's weekly Payment Period (**Sunday 00:00 → Saturday 23:59**) and are posted to the ledger every Sunday 05:00 AM.

4.1 Loan Repayment Matrix Rules (Principal Only)

Loan Amount	Weekly Principal Installment
$0 – $200	Paid in full (single installment)
$201 – $500	$100 per week

$501 – $1,000	$200 per week
$1,001 – $3,000	$250 per week
> $3,000	$300 per week

4.2 Interest Calculation

The **interest component** of each installment is calculated as:

Interest=Outstanding Principal×(Annual Interest Rate (%)100)×(Accrual Days365)\text{Interest} = \text{Outstanding Principal} \times \left(\frac{\text{Annual Interest Rate (\%)}}{100}\right) \times \left(\frac{\text{Accrual Days}}{365}\right)Interest=Outstanding Principal×(100Annual Interest Rate (%))×(365Accrual Days)Total Due=Principal Amount+Interest\text{Total Due} = \text{Principal Amount} + \text{Interest}Total Due=Principal Amount+Interest

Where:

- **Outstanding Principal** = Loan balance before the installment.
- **Annual Interest Rate (%)** = Entered at loan creation (e.g., 10 = 10%). System always divides by 100 before computation.
- **Accrual Days** = Number of days between **Loan Date (or last installment date)** and **Due Date (end of current Payment Period)**.
- **Principal Amount** = Derived from Loan Repayment Matrix.

👉 This ensures mid-week loans are computed accurately (e.g., a loan disbursed on Wednesday will accrue only 4 days of interest until the first Sunday).

4.3 Start Week Option

When creating a loan, the user selects when repayments begin:

- **Current Payment Period** → First installment posts in the DTR generated the upcoming Sunday.
- **Next Payment Period** → First installment posts in the DTR generated the following Sunday.

This ensures flexibility when loans are disbursed midweek or BAT wishes to defer repayment.

4.4 Payment Schedule Generation

Once Loan Amount and Interest Rate are entered:

1. System determines the **weekly principal portion** from the Loan Repayment Matrix.
2. System calculates **interest** using the formula above.
3. System generates installment rows until the loan balance = $0.
4. Each installment row includes **Principal, Interest, Total Due, Balance**.
5. The final installment is automatically adjusted if the remaining principal is less than the standard matrix installment.

4.5 Ledger Posting Logic

Each Sunday 05:00 AM, BAT Connect reviews all installments scheduled for that Payment Period:

- Marked as **Posted**.
- Written to **Ledger_Postings** with split values (Principal, Interest, Total Due).
- Linked via **Ledger Posting Ref**.

Once posted, installments cannot be deleted. Adjustments must be handled through **credits/reversals**.

4.6 Loan Lifecycle

- **Open** – At least one unpaid installment remains.
- **Closed** – All installments posted, Balance = $0.
- **Hold** – Loan flagged by BAT staff (blocks further postings until resolved).

4.7 Examples

Example 1 – 0% Interest (Straight Repayment)

- Loan Amount = $1,200
- Interest Rate = 0%
- Loan Date = Oct 1 (Wednesday)
- First Due Date = Oct 5 (Sunday) → Accrual Days = 4
- Weekly Principal (matrix: $1,001–$3,000) = $250

Interest=1200×0100×4365=0\text{Interest} = 1200 \times \frac{0}{100} \times \frac{4}{365} = 0Interest=1200×1000×3654=0Total Due=250+0=250\text{Total Due} = 250 + 0 = 250Total Due=250+0=250

Installment Row:

- Principal = 250
- Interest = 0
- Total Due = 250

Example 2 – 10% Interest, Midweek Loan

- Loan Amount = $1,200
- Interest Rate = 10%
- Loan Date = Oct 1 (Wednesday)
- First Due Date = Oct 5 (Sunday) → Accrual Days = 4
- Weekly Principal = $250

$$\text{Interest} = 1200 \times \frac{10}{100} \times \frac{4}{365} \approx 1.32$$$$\text{Interest} = 1200 \times \frac{10}{100} \times \frac{3}{654} \approx 1.32$$$$\text{Total Due} = 250 + 1.32 = 251.32$$$$\text{Total Due} = 250 + 1.32 = 251.32$$

Installment Row:

- Principal = 250
- Interest = 1.32
- Total Due = 251.32

Example 3 – Larger Loan, Full Week Interest

- Loan Amount = $3,000
- Interest Rate = 12%
- Loan Date = Oct 5 (Sunday)
- First Due Date = Oct 12 (Sunday) → Accrual Days = 7
- Weekly Principal = $300

$$\text{Interest} = 3000 \times \frac{12}{100} \times \frac{7}{365} \approx 6.90$$$$\text{Interest} = 3000 \times \frac{12}{100} \times \frac{7}{365} \approx 6.90$$$$\text{Total Due} = 300 + 6.90 = 306.90$$$$\text{Total Due} = 300 + 6.90 = 306.90$$

Installment Row:

- Principal = 300
- Interest = 6.90
- Total Due = 306.90

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$1,001 – $3,000	$250 per week
> $3,000	$300 per week

4.2 Interest Calculation

The **interest component** of each installment is calculated as:

$$\text{Interest} = \text{Outstanding Principal} \times \left(\frac{\text{Annual Interest Rate (\%)}}{100}\right) \times \left(\frac{\text{Accrual Days}}{365}\right)$$

$$\text{Total Due} = \text{Principal Amount} + \text{Interest}$$

Where:

- **Outstanding Principal** = Loan balance before the installment.

- **Annual Interest Rate (%)** = Entered at loan creation (e.g., 10 = 10%). System always divides by 100 before computation.
- **Accrual Days** = Number of days between **Loan Date (or last installment date)** and **Due Date (end of current Payment Period)**.
- **Principal Amount** = Derived from Loan Repayment Matrix.

This ensures mid-week loans are computed accurately (e.g., a loan disbursed on Wednesday will accrue only 4 days of interest until the first Sunday).

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Once posted, installments cannot be deleted. Adjustments must be handled through **credits/reversals**.

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- Weekly Principal (matrix: $1,001–$3,000) = $250

$$\text{Interest} = 1200 \times \frac{0}{100} \times \frac{4}{365} = 0$$

$$\text{Total Due} = 250 + 0 = 250$$

Installment Row:

- Principal = 250
- Interest = 0
- Total Due = 250

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- Loan Amount = $1,200
- Interest Rate = 10%
- Loan Date = Oct 1 (Wednesday)
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- Weekly Principal = $250

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$$\text{Total Due} = 250 + 1.32 = 251.32$$

Installment Row:

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Example 3 – Larger Loan, Full Week Interest

- Loan Amount = $3,000
- Interest Rate = 12%
- Loan Date = Oct 5 (Sunday)
- First Due Date = Oct 12 (Sunday) → Accrual Days = 7
- Weekly Principal = $300

$$\text{Interest} = 3000 \times \frac{12}{100} \times \frac{7}{365} \approx 6.90$$

$$\text{Total Due} = 300 + 6.90 = 306.90$$

Installment Row:

- Principal = 300
- Interest = 6.90
- Total Due = 306.90

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5. UI Workflow – Driver Loans (Updated)

The Driver Loans workflow enables BAT staff to create loans, auto-generate repayment schedules, and ensure installments are posted correctly into the Ledger, with transparency for both BAT and drivers.

Step 1 – Identify Driver & Lease

- Staff enters or scans the **Driver's TLC License Number**.
- System retrieves the driver profile and all associated Medallion / Lease accounts.
- **Staff selects the relevant Medallion / Lease ID (Lease account)** to tie the loan to.

Step 2 – Enter Loan Details

- Staff enters loan details directly in the app (no external invoice required):
  - **Loan Amount (Principal)**
  - **Annual Interest Rate (%)** (default = 0%)
  - **Purpose / Notes** (optional)
  - **Start Week** – Staff selects the start date from a **calendar dropdown**.
    - Only **Sundays** can be selected (to align with DTR Payment Periods).
    - This ensures loans can begin at any valid weekly cut-off, not just "current" or "next."
- VIN, Plate, Medallion, Hack License are already known from Step 1 and linked to the loan.

Step 3 – Generate & Confirm Payment Schedule

- On save, the system applies the **Loan Repayment Matrix** to determine the weekly **Principal Amount**.
- System calculates **Interest** per installment using the daily accrual formula.
- System generates the **Loan Schedule**, including for each row:
  - Installment ID
  - Week Start / End
  - Principal Amount
  - Interest Amount
  - Total Due
  - Remaining Balance
- Staff reviews and confirms the schedule.

Step 4 – Schedule Storage

- System stores:
  - **Loan Master** (all loan-level data).
  - **Loan Schedule** (installment rows with Principal, Interest, Total Due).
- At this stage, installments are in **Scheduled** state only — no postings yet.

Step 5 – Ledger Posting

- Each Sunday 05:00 AM:
  - Installments whose Payment Period has started are marked **Posted**.
  - A **Ledger Posting Reference** is created.

- **Ledger_Balances** is updated:
  - Principal portion reduces Outstanding Balance.
  - Interest portion is booked as an expense.
- Installments transition through lifecycle: Scheduled → Due → Posted → Paid.

Step 6 – DTR Representation

The DTR does not pull directly from the schedule. It pulls from **Ledger_Balances** only.

In the **Driver Loan section of the DTR**, drivers see:

- **This Week's Deduction** (Total Due posted for the week).
- **Prior Balance** (unpaid principal from earlier weeks).
- **Remaining Balance** (principal still outstanding).

Optional (for transparency):

- Original Loan Amount.
- Interest Rate applied.
- Total Paid Till Date.

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6. Validation Rules – Driver Loans

The following validation rules ensure consistency between **Loan Master, Loan Schedule, Ledger Postings, and the DTR**.

6.1 Loan-Level Validation

1. **Mandatory Fields** – Loan Amount, Interest Rate, Start Week must be entered before confirmation.
2. **Driver & Lease Linkage** – A Loan must always be tied to a valid Driver and selected Medallion / Lease ID.
3. **Unique Loan ID** – Loan IDs must be unique within the system.
4. **Loan Amount Integrity** – Loan Amount must be ≥ $1 and must equal the total Principal scheduled across installments.
5. **Interest Rate Integrity** – Interest Rate must be entered as a percentage (e.g., 10 = 10%). The system must always divide by 100 in computation.
6. **Start Week Selection** – Must align to a valid Payment Period (Sunday). Calendar dropdown should restrict to Sundays only.

6.2 Loan Schedule Validation

1. **Matrix Compliance** – Principal amounts must follow the Loan Repayment Matrix rules, except for the final installment, which may be adjusted.
2. **Interest Calculation** – Interest must follow the simple daily interest formula:

$$\text{Interest} = \text{Outstanding Principal} \times \left(\frac{\text{Annual Rate (\%)}}{100}\right) \times \frac{\text{Accrual Days}}{365}$$

3. **Total Due Integrity** – Total Due must equal Principal + Interest for each installment.
4. **Installment ID Integrity** – Each installment must have a unique ID linked to its parent Loan ID.
5. **Period Alignment** – Week Start = Sunday 00:00, Week End = Saturday 23:59.
6. **Continuity Rule** – No gaps or overlaps in installment periods once schedule is generated.
7. **Balance Accuracy** – For each installment:

$$\text{Balance} = \text{Loan Amount – (Sum of Principal Paid)}$$

Interest should not reduce principal balance.

6.3 Ledger Posting Validation

1. **Posting Trigger** – Installments are posted to the ledger only when their Payment Period has arrived (Sunday 05:00 AM).
2. **Ledger Linkage** – Every posted installment must include a Ledger Posting Reference (1:1 mapping between Installment ID and Ledger Posting ID).
3. **Principal vs Interest Split** – Ledger entries must separately record Principal (balance reduction) and Interest (expense).
4. **Reconciliation Rule** – The total of Loan postings in the Ledger for a Payment Period must match the Loan deductions in the DTR.
5. **Immutability** – Once posted, installments cannot be deleted. Adjustments must be made through credit or reversal entries.

6.4 DTR Validation

1. **Installment-Only Rule** – DTR must display only the installment(s) posted that week (Total Due), not the full loan amount.

2. **Outstanding Transparency** – DTR must display prior balance and remaining balance for driver clarity.
3. **Optional Transparency** – Recommended to show Original Loan Amount, Interest Rate, and Paid Till Date.
4. **Cross-Check** – Loan section in DTR must reconcile exactly with Ledger_Postings for that period.

6.5 Lifecycle Validation

1. **Loan Closure** – A Loan can only move to Closed when all installments are Posted (and optionally marked Paid).
2. **Hold Handling** – If Loan is set to Hold, associated installments remain frozen in Scheduled/Due until hold is lifted.
3. **Cancellation Rule** – Loans may only be cancelled before the first installment posting. Cancellation automatically voids all associated Scheduled installments.
4. **Audit Trail** – Created By, Updated By, and Timestamps must be captured for both Loans and Installments.
