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DATABASE SCHEMA & ERD DOCUMENTATION

Database Overview

Database Name: koperasi
Engine: MySQL 8.0+ / MariaDB 10.6+
Charset: utf8mb4 (Unicode support)
Collation: utf8mb4_unicode_ci
Total Tables: ~65 tables
Normalization Level: 3NF (Third Normal Form)

Database Architecture

DATABASE LAYER ARCHITECTURE

MASTER	TRANSACTIONAL	SYSTEM
DATA	DATA	DATA

RELATIONAL INTEGRITY ENGINE
(Foreign Keys, Constraints, Triggers)

COMPLETE ENTITY RELATIONSHIP DIAGRAM (ERD)

MODULE 1: USER & MEMBERSHIP

USERS TABLE

id	BIGINT UNSIGNED (PK)
name	VARCHAR(255)
email	VARCHAR(255) UNIQUE
password	VARCHAR(255)
role	ENUM('admin', 'pengurus', 'manager_toko', 'anggota')
email_verified_at	TIMESTAMP NULL
remember_token	VARCHAR(100)
created_at, updated_at	TIMESTAMP

1:1

MEMBERS TABLE

id	BIGINT UNSIGNED (PK)	
user_id	BIGINT UNSIGNED (FK) UNIQUE	→ users.id
member_id	VARCHAR(20) UNIQUE	→ A-0001, A-0002
employee_id	VARCHAR(20) UNIQUE	→ NIK
phone	VARCHAR(20)	
address	TEXT	
department_id	BIGINT UNSIGNED (FK)	→ departments.id
position_id	BIGINT UNSIGNED (FK)	→ positions.id
join_date	DATE	
status	ENUM('pending', 'active', 'inactive')	
credit_limit	DECIMAL(15,2) DEFAULT 0	
credit_used	DECIMAL(15,2) DEFAULT 0	
points	INT DEFAULT 0	
photo	VARCHAR(255)	
created_at, updated_at	TIMESTAMP	

N:1

N:1

DEPARTMENTS

id	(PK)
name	
description	
created_at	

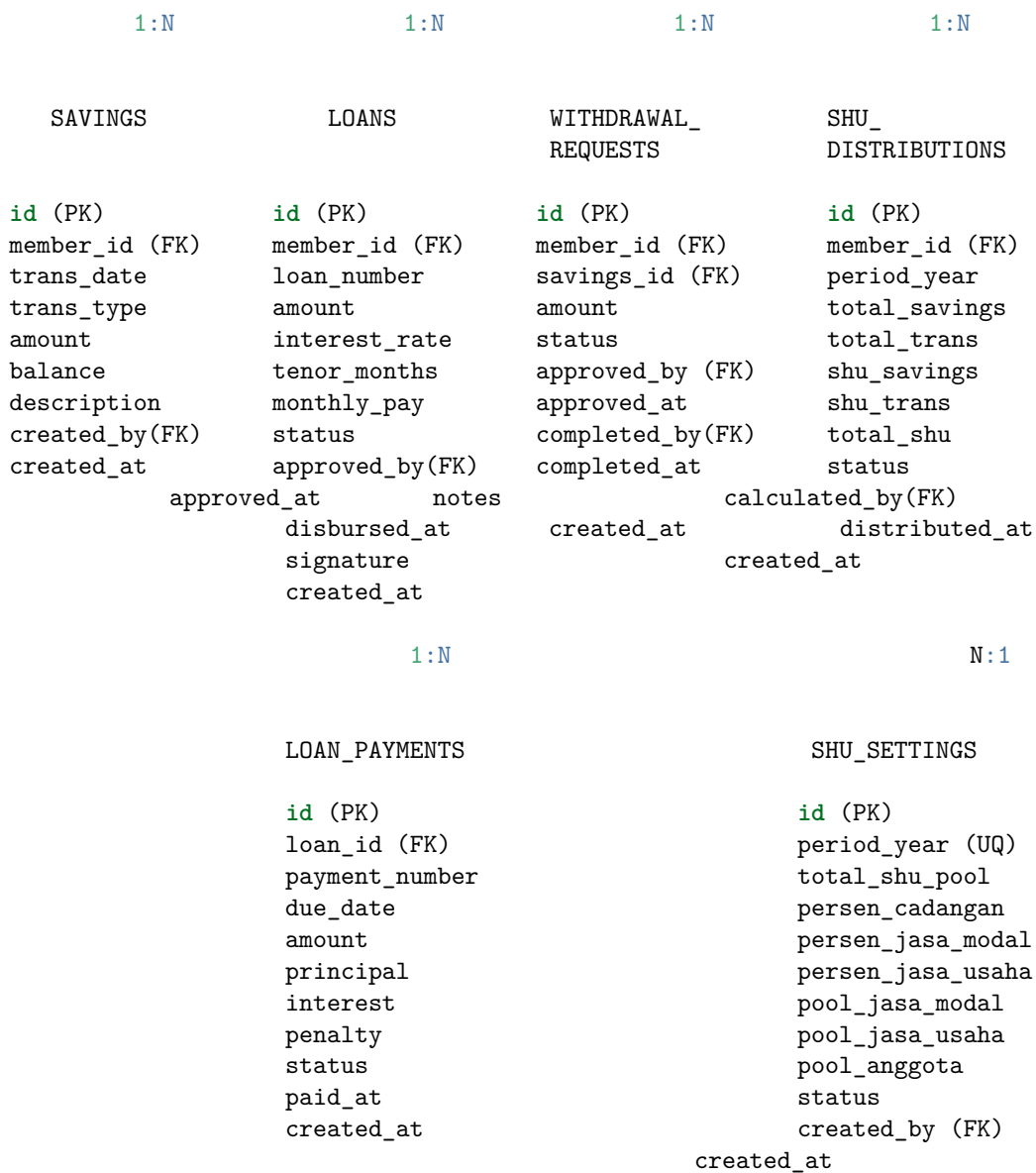
POSITIONS

id	(PK)
name	
description	
created_at	

Relasi: - users → members : 1:1 (One user has exactly one member profile) - members → departments : N:1 (Many members in one department) - members → positions : N:1 (Many members have same position)

MODULE 2: FINANCE

MEMBERS



Relasi: - members → savings : 1:N - members → loans : 1:N - loans → loan_payments : 1:N -

members → withdrawal_requests : 1:N - members → shu_distributions : 1:N - shu_settings → shu_distributions : 1:N (via period_year)

MODULE 3: COMMERCE/MART

CATEGORIES

id (PK)
name
description
is_active
created_at

1:N

PRODUCTS

id	BIGINT UNSIGNED (PK)	
category_id	BIGINT UNSIGNED (FK)	→ categories.id
name	VARCHAR(255)	
barcode	VARCHAR(100) UNIQUE	
price	DECIMAL(15,2)	
cost	DECIMAL(15,2)	
stock	INT	
min_stock	INT DEFAULT 10	
is_preorder	BOOLEAN DEFAULT FALSE	
image	VARCHAR(255)	
is_active	BOOLEAN DEFAULT TRUE	
created_at, updated_at	TIMESTAMP	

1:N

1:N

1:N

TRANSACTION_ ITEMS	PURCHASE_ ITEMS	STOCK_ OPNAMES	CONSIGNMENT_ INBOUNDS
id (PK)	id (PK)	id (PK)	id (PK)
transaction_id (FK)	purchase_id (FK)	product_id (FK)	product_id (FK)
product_id (FK)	product_id (FK)	system_stock	supplier_name
quantity	quantity	physical_stk	quantity
price	price	difference	consign_price
discount	subtotal	notes	sell_price
subtotal	created_at	audited_by	commission
created_at		audited_at	created_at

N:1

N:1

TRANSACTIONS	PURCHASES
id (PK) transaction_no user_id (FK) cashier_id (FK) voucher_id (FK) total_amount discount_amount final_amount payment_method payment_status status notes created_at	id (PK) purchase_no supplier_id (FK) purchase_date total_amount status created_by created_at
	N:1
VOUCHERS	SUPPLIERS
id (PK) code (UNIQUE) type value min_purchase max_usage used_count start_date end_date is_active created_at	id (PK) name contact address term_payment created_at
	N:1
EXPENSE_CATEGORIES	EXPENSES
id (PK) name description created_at	id (PK) category_id (FK) date amount description receipt approved_by (FK) approved_at created_at

Relasi Utama: - categories → products : 1:N - products → transaction_items : 1:N - transactions → transaction_items : 1:N - users → transactions : 1:N (as customer & as cashier) - vouchers → transactions : 1:N - suppliers → purchases : 1:N - purchases → purchase_items : 1:N - expense_categories → expenses : 1:N

MODULE 4: ACCOUNTING

ACCOUNT_CATEGORIES

id (PK)	
name	→ Aset, Liabilitas, Modal, Pendapatan, Biaya
type	→ asset, liability, equity, revenue, expense
created_at	

1:N

ACCOUNTS (COA)

id	BIGINT UNSIGNED (PK)	
category_id	BIGINT UNSIGNED (FK)	→ account_categories. id
code	VARCHAR(20) UNIQUE	→ 1101, 2301, 3101
name	VARCHAR(255)	→ Kas, Hutang Bank, Modal
description	TEXT	
is_active	BOOLEAN DEFAULT TRUE	
created_at, updated_at	TIMESTAMP	

1:N

JOURNAL_ENTRY_LINES

id	BIGINT UNSIGNED (PK)	
journal_entry_id	BIGINT UNSIGNED (FK)	→ journal_entries. id
account_id	BIGINT UNSIGNED (FK)	→ accounts. id
debit	DECIMAL(15,2) DEFAULT 0	
credit	DECIMAL(15,2) DEFAULT 0	
description	VARCHAR(255)	
created_at	TIMESTAMP	

N:1

JOURNAL_ENTRIES

id	BIGINT UNSIGNED (PK)	
journal_number	VARCHAR(50) UNIQUE	→ JRN-20260117-0001
transaction_date	DATE	
description	TEXT	
reference_type	VARCHAR(255) NULL	→ POLYMORPHIC
reference_id	BIGINT UNSIGNED NULL	→ POLYMORPHIC
total_debit	DECIMAL(15,2)	
total_credit	DECIMAL(15,2)	
status	ENUM('draft', 'posted')	
created_by	BIGINT UNSIGNED (FK)	
posted_by	BIGINT UNSIGNED (FK) NULL	

posted_at TIMESTAMP NULL
 created_at, updated_at TIMESTAMP

N:1 (optional)

BANK_TRANSACTIONS

id BIGINT UNSIGNED (PK)
 transaction_date DATE
 description VARCHAR(255)
 debit DECIMAL(15,2) DEFAULT 0
 credit DECIMAL(15,2) DEFAULT 0
 balance DECIMAL(15,2)
 journal_entry_id BIGINT UNSIGNED (FK) NULL → journal_entries.id
 status ENUM('pending', 'matched',
 'reconciled')
 notes TEXT
 created_at TIMESTAMP

Relasi: - account_categories → accounts : 1:N - accounts → journal_entry_lines : 1:N -
 journal_entries → journal_entry_lines : 1:N - journal_entries [loans, transactions, expenses]
 : POLYMORPHIC N:1 - bank_transactions → journal_entries : N:1 (for reconciliation)

MODULE 5: ORGANIZATION & DOCUMENTS

ORGANIZATION_ASSETS

id BIGINT UNSIGNED (PK)
 name VARCHAR(255)
 category ENUM('tanah', 'bangunan',
 'kendaraan', 'elektronik',
 'furniture')
 purchase_date DATE
 purchase_price DECIMAL(15,2)
 current_value DECIMAL(15,2)
 condition ENUM('baik', 'rusak', 'hilang')
 location VARCHAR(255)
 notes TEXT
 created_at TIMESTAMP

ORGANIZATION_MEETINGS

id BIGINT UNSIGNED (PK)
 meeting_date DATE
 meeting_type ENUM('pengurus', 'anggota',
 'rat')
 agenda TEXT

decisions	TEXT
attendeers	TEXT
notes	TEXT
created_by	BIGINT UNSIGNED (FK)
created_at	TIMESTAMP

ORGANIZATION_PROFILES

id	BIGINT UNSIGNED (PK)
name	VARCHAR(255)
position	VARCHAR(100)
period_start	DATE
period_end	DATE
phone	VARCHAR(20)
photo	VARCHAR(255)
created_at	TIMESTAMP

DOCUMENT_TEMPLATES

id	BIGINT UNSIGNED (PK)	
name	VARCHAR(255)	
type	ENUM('official', 'membership', 'loan', 'other')	
content	LONGTEXT	→ HTML template
placeholders	JSON	→ ["nama", "tanggal"]
created_at	TIMESTAMP	

1:N (via document_type)

GENERATED_DOCUMENTS

id	CHAR(36) (PK, UUID)	
document_number	VARCHAR(50)	→ 001/UND/I/2026
document_type	VARCHAR(255)	→ Surat Undangan
user_id	BIGINT UNSIGNED (FK) NULL	→ users.id (creator)
generated_by	BIGINT UNSIGNED (FK) NULL	→ users.id
data	JSON	→ Filled placeholders
reference_type	VARCHAR(255) NULL	→ POLYMORPHIC
reference_id	BIGINT UNSIGNED NULL	→ POLYMORPHIC
verified_at	TIMESTAMP NULL	
created_at	TIMESTAMP	

Polymorphic Relation: - generated_documents.reference_type + reference_id bisa ke: - Member (untuk Kartu Anggota) - ShuDistribution (untuk SHU Slip)

MODULE 6: COMMUNICATION

ANNOUNCEMENTS

<code>id</code>	<code>BIGINT UNSIGNED (PK)</code>
<code>title</code>	<code>VARCHAR(255)</code>
<code>content</code>	<code>TEXT</code>
<code>image</code>	<code>VARCHAR(255) NULL</code>
<code>is_active</code>	<code>BOOLEAN DEFAULT TRUE</code>
<code>published_at</code>	<code>TIMESTAMP NULL</code>
<code>created_by</code>	<code>BIGINT UNSIGNED (FK)</code>
<code>created_at</code>	<code>TIMESTAMP</code>

POLLS

<code>id</code>	<code>BIGINT UNSIGNED (PK)</code>
<code>title</code>	<code>VARCHAR(255)</code>
<code>description</code>	<code>TEXT</code>
<code>start_date</code>	<code>DATE</code>
<code>end_date</code>	<code>DATE</code>
<code>is_active</code>	<code>BOOLEAN DEFAULT TRUE</code>
<code>created_by</code>	<code>BIGINT UNSIGNED (FK)</code>
<code>created_at</code>	<code>TIMESTAMP</code>

`1:N`

POLL_OPTIONS

<code>id</code>	<code>BIGINT UNSIGNED (PK)</code>	
<code>poll_id</code>	<code>BIGINT UNSIGNED (FK)</code>	<code>→ polls.id</code>
<code>option_text</code>	<code>VARCHAR(255)</code>	
<code>votes_count</code>	<code>INT DEFAULT 0</code>	
<code>created_at</code>	<code>TIMESTAMP</code>	

`1:N`

POLL_VOTES

<code>id</code>	<code>BIGINT UNSIGNED (PK)</code>	
<code>poll_option_id</code>	<code>BIGINT UNSIGNED (FK)</code>	<code>→ poll_options.id</code>
<code>user_id</code>	<code>BIGINT UNSIGNED (FK)</code>	<code>→ users.id</code>
<code>voted_at</code>	<code>TIMESTAMP</code>	

MEMBER_ASPIRATIONS

<code>id</code>	<code>BIGINT UNSIGNED (PK)</code>
<code>user_id</code>	<code>BIGINT UNSIGNED (FK)</code>

category	ENUM('layanan', 'produk', 'keluhan', 'saran')
subject	VARCHAR(255)
message	TEXT
status	ENUM('pending', 'reviewed', 'resolved')
admin_response	TEXT NULL
responded_by	BIGINT UNSIGNED (FK) NULL
responded_at	TIMESTAMP NULL
created_at	TIMESTAMP

MODULE 7: SYSTEM

SETTINGS (Key-Value)

id	BIGINT UNSIGNED (PK)
key	VARCHAR(100) UNIQUE
value	TEXT
created_at	TIMESTAMP

AUDIT_LOGS

id	BIGINT UNSIGNED (PK)	
user_id	BIGINT UNSIGNED (FK) NULL	
action	VARCHAR(50)	→ create, update, delete
model	VARCHAR(255)	→ Member, Loan, etc
model_id	BIGINT UNSIGNED NULL	
changes	JSON	→ Before/after values
ip_address	VARCHAR(45)	
user_agent	TEXT	
created_at	TIMESTAMP	

NOTIFICATIONS (Laravel)

id	CHAR(36) (PK, UUID)	
type	VARCHAR(255)	
notifiable_type	VARCHAR(255)	→ User
notifiable_id	BIGINT UNSIGNED	
data	JSON	
read_at	TIMESTAMP NULL	
created_at	TIMESTAMP	

FOREIGN KEY RELATIONSHIPS

Critical Foreign Keys:

```
-- User & Member
ALTER TABLE members
    ADD CONSTRAINT fk_members_user
    FOREIGN KEY (user_id) REFERENCES users(id)
    ON DELETE CASCADE;

-- Finance
ALTER TABLE savings
    ADD CONSTRAINT fk_savings_member
    FOREIGN KEY (member_id) REFERENCES members(id);

ALTER TABLE loans
    ADD CONSTRAINT fk_loans_member
    FOREIGN KEY (member_id) REFERENCES members(id);

ALTER TABLE loan_payments
    ADD CONSTRAINT fk_loan_payments_loan
    FOREIGN KEY (loan_id) REFERENCES loans(id)
    ON DELETE CASCADE;

-- Commerce
ALTER TABLE products
    ADD CONSTRAINT fk_products_category
    FOREIGN KEY (category_id) REFERENCES categories(id);

ALTER TABLE transaction_items
    ADD CONSTRAINT fk_transaction_items_trans
    FOREIGN KEY (transaction_id) REFERENCES transactions(id)
    ON DELETE CASCADE;

ALTER TABLE transaction_items
    ADD CONSTRAINT fk_transaction_items_product
    FOREIGN KEY (product_id) REFERENCES products(id);

-- Accounting
ALTER TABLE journal_entry_lines
    ADD CONSTRAINT fk_journal_lines_entry
    FOREIGN KEY (journal_entry_id) REFERENCES journal_entries(id)
    ON DELETE CASCADE;

ALTER TABLE journal_entry_lines
    ADD CONSTRAINT fk_journal_lines_account
    FOREIGN KEY (account_id) REFERENCES accounts(id);
```

INDEXES & OPTIMIZATION

Primary Keys:

All tables have id as **BIGINT UNSIGNED AUTO_INCREMENT PRIMARY KEY**

Unique Constraints:

```
-- Users
users.email (UNIQUE)

-- Members
members.user_id (UNIQUE)
members.member_id (UNIQUE)
members.employee_id (UNIQUE)

-- Products
products.barcode (UNIQUE)

-- Accounts
accounts.code (UNIQUE)

-- Settings
settings.key (UNIQUE)

-- Documents
document_templates.name (UNIQUE per type)
generated_documents.document_number (UNIQUE)
```

Composite Indexes:

```
-- For performance optimization
INDEX idx_trans_date_status ON transactions(transaction_date, status);
INDEX idx_shu_year_member ON shu_distributions(period_year, member_id);
INDEX idx_loan_status ON loans(status, approved_at);
INDEX idx_savings_member_date ON savings(member_id, transaction_date);
INDEX idx_journal_reference ON journal_entries(reference_type, reference_id);
```

DATA INTEGRITY RULES

Constraints:

1. **Balance Validation:**
 - members.credit_used ≤ members.credit_limit
 - journal_entries.total_debit = journal_entries.total_credit
 2. **Status Transitions:**
 - loans.status: pending → approved → active → completed
 - withdrawal_requests.status: pending → approved → completed
 3. **Date Logic:**
 - organization_profiles.period_end > period_start
 - polls.end_date > start_date
 4. **Cascading Deletes:**
 - Delete user → delete member profile
 - Delete loan → delete loan_payments
 - Delete transaction → delete transaction_items
 - Delete journal_entry → delete journal_entry_lines
 5. **Soft Deletes:**
 - **NOT USED** - Hard delete with audit log trail
-

STATISTICS & CAPACITY

Metric	Value
Total Tables	~65
Tables with FK	~45
Total Indexes	~120+
Avg Columns per Table	8-12
Max Text/JSON Fields	15 tables
Polymorphic Relations	2 (journal_entries, generated_documents)
Expected DB Size (1 year)	~500MB - 2GB
Expected Growth Rate	~100MB/year

BACKUP STRATEGY

Automated Daily Backup:

Laravel command

```
php artisan backup:run
```

Manual MySQL dump

```
mysqldump -u root koperasi > backup_$(date +%Y%m%d).sql
```

Retention Policy: - Daily backups: Keep 30 days - Weekly backups: Keep 3 months - Monthly backups: Keep 1 year

MIGRATION MANAGEMENT

Location: database/migrations/

Total Migrations: 65+ files

Naming Convention: YYYY_MM_DD_HHMMSS_descriptive_name.php

Run Migrations:

Fresh install

```
php artisan migrate:fresh --seed
```

Production (safe)

```
php artisan migrate
```

Rollback last batch

```
php artisan migrate:rollback
```

Check status

```
php artisan migrate:status
```

SCHEMA VERSIONING

Current Schema Version: 2.0

Last Updated: 17 January 2026

Major Changes: - v1.0 (Dec 2025): Initial schema - v1.5 (Jan 2026): Added document generator tables - v2.0 (Jan 2026): Accounting module + bank reconciliation

Maintainer: Database Team
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