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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 | | | |
|---|---|---|---|
| 1:N | 1:N | 1:N | 1:N |
| SAVINGS | LOANS | WITHDRAWAL_REQUESTS | SHU_DISTRIBUTIONS |
| <code>id</code> (PK) <code>member_id</code> (FK) <code>trans_date</code> <code>trans_type</code> <code>amount</code> <code>balance</code> <code>description</code> <code>created_by</code> (FK) <code>created_at</code> <code>approved_at</code> <code>notes</code> <code>disbursed_at</code> <code>signature</code> <code>created_at</code> | <code>id</code> (PK) <code>member_id</code> (FK) <code>loan_number</code> <code>amount</code> <code>interest_rate</code> <code>tenor_months</code> <code>monthly_pay</code> <code>status</code> <code>approved_by</code> (FK) <code>approved_at</code> <code>notes</code> <code>disbursed_at</code> <code>signature</code> <code>created_at</code> | <code>id</code> (PK) <code>member_id</code> (FK) <code>savings_id</code> (FK) <code>amount</code> <code>status</code> <code>approved_by</code> (FK) <code>approved_at</code> <code>completed_by</code> (FK) <code>completed_at</code> <code>calculated_by</code> (FK) <code>created_at</code> <code>distributed_at</code> <code>created_at</code> | <code>id</code> (PK) <code>member_id</code> (FK) <code>period_year</code> <code>total_savings</code> <code>total_trans</code> <code>shu_savings</code> <code>shu_trans</code> <code>total_shu</code> <code>status</code> <code>calculated_by</code> (FK) <code>distributed_at</code> <code>created_at</code> |
| | | 1:N | N:1 |
| LOAN_PAYMENTS | | SHU_SETTINGS | |
| <code>id</code> (PK) <code>loan_id</code> (FK) <code>payment_number</code> <code>due_date</code> <code>amount</code> <code>principal</code> <code>interest</code> <code>penalty</code> <code>status</code> <code>paid_at</code> <code>created_at</code> | | <code>id</code> (PK) <code>period_year</code> (UQ) <code>total_shu_pool</code> <code>persen_cadangan</code> <code>persen_jasa_modal</code> <code>persen_jasa_usaha</code> <code>pool_jasa_modal</code> <code>pool_jasa_usaha</code> <code>pool_anggota</code> <code>status</code> <code>created_by</code> (FK) <code>created_at</code> | |

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

| | | |
|------------------------|-----------------------|-------------------------------|
| <code>id</code> | BIGINT UNSIGNED (PK) | |
| category_id | BIGINT UNSIGNED (FK) | → categories. <code>id</code> |
| name | VARCHAR(255) | |
| barcode | VARCHAR(100) UNIQUE | |
| price | DECIMAL(15,2) | |
| <code>cost</code> | 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 |
| <code>id</code> (PK) | <code>id</code> (PK) | <code>id</code> (PK) | <code>id</code> (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 | discount | notes | sell_price |
| subtotal | subtotal | audited_by | commission |
| created_at | created_at | audited_at | created_at |

N:1

N:1

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

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
attendees         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
placeholders      JSON
created_at        TIMESTAMP

```

→ HTML template
→ ["nama", "tanggal"]

1:N (via document_type)

GENERATED_DOCUMENTS

```

id                CHAR(36) (PK, UUID)
document_number   VARCHAR(50)
document_type     VARCHAR(255)
user_id           BIGINT UNSIGNED (FK) NULL
generated_by      BIGINT UNSIGNED (FK) NULL
data              JSON
reference_type    VARCHAR(255) NULL
reference_id      BIGINT UNSIGNED NULL
verified_at       TIMESTAMP NULL
created_at        TIMESTAMP

```

→ 001/UND/I/2026
→ Surat Undangan
→ users.id (creator)
→ users.id
→ Filled placeholders
→ POLYMORPHIC
→ POLYMORPHIC

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

MODULE 6: COMMUNICATION

ANNOUNCEMENTS

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

POLLS

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

1:N

POLL_OPTIONS

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

1:N

POLL_VOTES

```
id          BIGINT UNSIGNED (PK)
poll_option_id BIGINT UNSIGNED (FK)  → poll_options.id
user_id      BIGINT UNSIGNED (FK)  → users.id
voted_at     TIMESTAMP
```

MEMBER_ASPIRATIONS

```
id          BIGINT UNSIGNED (PK)
user_id    BIGINT UNSIGNED (FK)
```

```

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 (<code>journal_entries</code> , <code>generated_documents</code>) |
| 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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