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1 DATABASE SCHEMA & ERD DOCUMENTATION

1.1 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)

1.2 Database Architecture

DATABASE LAYER ARCHITECTURE

MASTER DATA	TRANSACTIONAL DATA	SYSTEM DATA
----------------	-----------------------	----------------

RELATIONAL INTEGRITY ENGINE
(Foreign Keys, Constraints, Triggers)

1.3 COMPLETE ENTITY RELATIONSHIP DIAGRAM (ERD)

1.3.1 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

POSITIONS

id (PK)	id (PK)
name	name
description	description
created_at	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)

1.3.2 MODULE 2: FINANCE

MEMBERS

1:N

1:N

1:N

1:N

SAVINGS

LOANS

WITHDRAWAL_ REQUESTS

SHU_ DISTRIBUTIONS

id (PK)	id (PK)	id (PK)	id (PK)
member_id (FK)	member_id (FK)	member_id (FK)	member_id (FK)
trans_date	loan_number	savings_id (FK)	period_year
trans_type	amount	amount	total_savings
amount	interest_rate	status	total_trans
balance	tenor_months	approved_by (FK)	shu_savings
description	monthly_pay	approved_at	shu_trans
created_by(FK)	status	completed_by(FK)	total_shu
created_at	approved_by(FK)	completed_at	status
approved_at	notes	calculated_by(FK)	
	disbursed_at	created_at	distributed_at
	signature		created_at
	created_at		

1:N

N:1

LOAN_PAYMENTS	SHU_SETTINGS
id (PK)	id (PK)
loan_id (FK)	period_year (UQ)
payment_number	total_shu_pool
due_date	persen_cadangan
amount	persen_jasa_modal
principal	persen_jasa_usaha
interest	pool_jasa_modal
penalty	pool_jasa_usaha
status	pool_anggota
paid_at	status
created_at	created_by (FK)
	created_at

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)

1.3.3 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 (FK)	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)	id (PK)
transaction_no	purchase_no
user_id (FK)	supplier_id (FK)
cashier_id (FK)	purchase_date
voucher_id (FK)	total_amount
total_amount	status
discount_amount	created_by
final_amount	created_at
payment_method	
payment_status	
status	
notes	N:1
created_at	

SUPPLIERS

N:1

id (PK)

name	
VOUCHERS	contact
address	
id (PK)	term_payment

```

code (UNIQUE)           created_at
type
value
min_purchase
max_usage
used_count
start_date
end_date
is_active
created_at

```

EXPENSE_CATEGORIES 1:N EXPENSES

id (PK)	id (PK)
name	category_id (FK)
description	date
created_at	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

1.3.4 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)

1.3.5 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

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

DOCUMENT_TEMPLATES

<code>id</code>	BIGINT UNSIGNED (PK)
<code>name</code>	VARCHAR(255)
<code>type</code>	ENUM('official','membership', 'loan','other')
<code>content</code>	LONGTEXT
<code>placeholders</code>	JSON
<code>created_at</code>	TIMESTAMP

`1:N` (via `document_type`)

GENERATED_DOCUMENTS

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

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

1.3.6 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

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

1.3.7 MODULE 7: SYSTEM

SETTINGS (Key-Value)

<code>id</code>	<code>BIGINT UNSIGNED (PK)</code>
<code>key</code>	<code>VARCHAR(100) UNIQUE</code>
<code>value</code>	<code>TEXT</code>
<code>created_at</code>	<code>TIMESTAMP</code>

AUDIT_LOGS

<code>id</code>	<code>BIGINT UNSIGNED (PK)</code>
<code>user_id</code>	<code>BIGINT UNSIGNED (FK) NULL</code>
<code>action</code>	<code>VARCHAR(50)</code>
<code>model</code>	<code>VARCHAR(255)</code>
<code>model_id</code>	<code>BIGINT UNSIGNED NULL</code>
<code>changes</code>	<code>JSON</code>
<code>ip_address</code>	<code>VARCHAR(45)</code>
<code>user_agent</code>	<code>TEXT</code>
<code>created_at</code>	<code>TIMESTAMP</code>

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

```

1.4 FOREIGN KEY RELATIONSHIPS

1.4.1 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);
```

1.5 INDEXES & OPTIMIZATION

1.5.1 Primary Keys:

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

1.5.2 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)
```

1.5.3 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);
```

1.6 DATA INTEGRITY RULES

1.6.1 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
-

1.7 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

1.8 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

1.9 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
```

1.10 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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