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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	TRANSACTIONAL	SYSTEM
DATA	DATA	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	
SAVINGS		WITHDRAWAL_	
		REQUESTS	
id (PK)		id (PK)	
member_id (FK)		member_id (FK)	
trans_date		savings_id (FK)	
trans_type		amount	
amount		status	
balance		approved_by (FK)	
description		approved_at	
created_by(FK)		completed_by(FK)	
created_at		completed_at	
	approved_at		calculated_by(FK)
	notes		
	disbursed_at	created_at	distributed_at
	signature		created_at
	created_at		
1:N		N:1	
LOANS		SHU_	
		DISTRIBUTIONS	
id (PK)		id (PK)	
member_id (FK)		member_id (FK)	
loan_number		period_year	
amount		total_savings	
interest_rate		total_trans	
tenor_months		shu_savings	
monthly_pay		shu_trans	
status		total_shu	
approved_by(FK)		status	

#### LOAN\_PAYMENTS

`id` (PK)  
`loan_id` (FK)  
`payment_number`  
`due_date`  
`amount`  
`principal`  
`interest`  
`penalty`  
`status`  
`paid_at`  
`created_at`

#### SHU\_SETTINGS

`id` (PK)  
`period_year` (UQ)  
`total_shu_pool`  
`persen_cadangan`  
`persen_jasa_modal`  
`persen_jasa_usaha`  
`pool_jasa_modal`  
`pool_jasa_usaha`  
`pool_anggota`  
`status`  
`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`  
`category_id`  
`name`  
`barcode`  
`price`  
`cost`  
`stock`  
`min_stock`  
`is_preorder`  
`image`

BIGINT UNSIGNED (PK)  
BIGINT UNSIGNED (FK)  
VARCHAR(255)  
VARCHAR(100) UNIQUE  
DECIMAL(15,2)  
DECIMAL(15,2)  
INT  
INT DEFAULT 10  
BOOLEAN DEFAULT FALSE  
VARCHAR(255)

→ categories.id

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)	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

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)

### 1.3.6 MODULE 6: COMMUNICATION

#### ANNOUNCEMENTS

<b>id</b>	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

<b>id</b>	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

<b>id</b>	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

<b>id</b>	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

---

### 1.3.7 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	

---

## 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

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**Maintainer:** Database Team

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