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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)

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### 1.2 Database Architecture

#### DATABASE LAYER ARCHITECTURE

MASTER	TRANSACTIONAL	SYSTEM
DATA	DATA	DATA

# Daftar Isi

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## 1 DOKUMENTASI SKEMA DATABASE & ERD

### 1.1 Ikhtisar Database

Nama Database: koperasi

Mesin: MySQL 8.0+ / MariaDB 10.6+

Charset: utf8mb4 (dukungan Unicode)

Kolasi: utf8mb4\_unicode\_ciTotal Tabel:

~65 tabel

Tingkat Normalisasi: 3NF (Bentuk Normal Ketiga)

### 1.2 Arsitektur Database

#### ARSITEKTUR LAPISAN DATABASE

MASTER  
DATA

SISTEM TRANSAKSI  
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	

MESIN INTEGRITAS RELASIONAL  
(Kunci Asing, Pembatasan, Pemicu)

### 1.3 DIAGRAM HUBUNGAN ENTITAS LENGKAP (ERD)

#### 1.3.1 MODUL 1: PENGGUNA & KEANGGOTAAN

##### TABEL PENGGUNA

<b>id</b>	BIGINT UNSIGNED (PK)
nama	VARCHAR(255)
email	<b>VARCHAR(255) UNIK</b>
<b>kata sandi</b>	VARCHAR(255)
<b>peran</b>	ENUM('admin', 'pengurus', 'manager_toko', 'anggota')
email_verified_at	<b>TIMESTAMP NULL</b>
remember_token	VARCHAR(100)
<b>created_at, updated_at</b> <b>TIMESTAMP</b>	

1:1

##### TABEL ANGGOTA

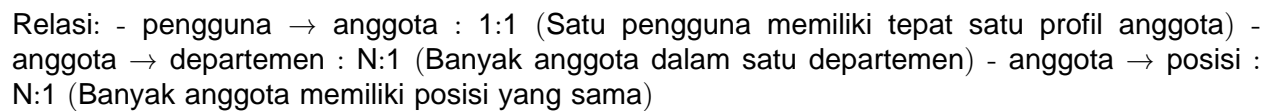
<b>id</b>	BIGINT UNSIGNED (PK)	
user_id	<b>BIGINT UNSIGNED (FK) UNIK</b>	→ <b>users.id</b>
member_id	<b>VARCHAR(20) UNIK</b>	→ A-0001, A-0002
employee_id	<b>VARCHAR(20) UNIK</b>	→ NIK
phone	VARCHAR(20)	
alamat	TEKS	
department_id	BIGINT TIDAK TANDA (FK)	→ <b>departments.id</b>
position_id	BIGINT TIDAK TANDA (FK)	→ <b>positions.id</b>
join_date	<b>TANG GAL</b>	
status	ENUM('pending', 'active', 'inactive')	
batas_kredit	<b>DECIMAL(15,2) DEFAULT 0</b>	
kredit_digunakan	DECIMAL(15,2)	
point	DEFAULT 0 INT DEFAULT 0	
foto	OVARCHAR(255)	
<b>created_at, updated_at</b> <b>TIMESTAMP</b>		

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	



## ANGGOTA



#### 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`

#### PEMBAYARAN\_PINJAMAN

id (PK)  
 loan\_id (FK)  
 nomor\_pembayaran  
  
 tanggal\_jatuh\_  
 tempo jumlah  
 pokok  
 bunga  
 denda  
  
 status  
 dibayar\_pada  
 dibuat\_pada

#### PENGATURAN\_SHU

id (PK)  
 periode\_tahun (UQ)  
 total\_kolam\_shu  
 persen\_cadangan  
 persen\_jasa\_modal  
 persen\_jasa\_usaha  
 kolam\_jasa\_modal  
 kolam\_jasa\_usaha  
 kolam\_anggota  
 status  
 dibuat\_oleh (FK)  
 dibuat\_pada

Relasi: - anggota → tabungan : 1:N - anggota → pinjaman : 1:N - pinjaman → pembayaran\_pinjaman : 1:N - anggota → permintaan\_penarikan : 1:N - anggota → distribusi\_shu : 1:N - pengaturan\_shu → distribusi\_shu : 1:N (via periode\_tahun)

### 1.3.3 MODUL 3: PERDAGANGAN/PASAR

#### KATEGORI

id (PK)  
 nama  
 deskripsi  
 aktif  
 dibuat\_pada

1:N

#### PRODUK

id  
 kategori\_id  
 nama  
 kode\_barkod  
 harga  
 biaya  
 stok  
 min\_stok  
 adalah\_preorder  
 gambar

BIGINT UNSIGNED (PK)  
 BIGINT UNSIGNED (FK)  
 VARCHAR(255)  
**VARCHAR(100) UNIK**  
 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

is\_active **BOOLEAN DEFAULT TRUE**  
 created\_at, updated\_at **TIMESTAMP**

1:N	1:N	1:N	
TRANSACTION_ ITEMS	PURCHASE_ ITEMS	STOCK_ OPNAMES	CONSIGNMENT_ DI DALAM BATAS
id (PK)	id (PK)	id (PK)	id (PK)
transaction_id (FK)	purchase_id (FK)	product_id (FK)	id_produk (FK)
product_id (FK)	product_id (FK)	sistem_stok	nama_pemasok
quantity	jumlah	fisik_stk	jumlah
price	harga	perbedaan	harga_konsinyasi
diskon	subtotal	catatan	harga_jual
subtotal	dibuat_pada	diaudit_oleh	komisi
dibuat_pada		diaudit_pada	dibuat_pada

N:1	N:1
TRANSAKSI	PEMBELIAN
id (PK)	id (PK)
nomor_transaksi	nomor_pembelian
id_pengguna (FK)	id_pemasok
id_kasir (FK)	<small>id_kasir (FK)</small>
id_voucher (FK)	tanggal_pembelian
total_jumlah	total_jumlah
jumlah_diskon	status
jumlah_akhir	dibuat_oleh
<small>metode_pembayaran</small>	dibuat_pada
status	
catatan	
dibuat_pada	

	PENYUPLAI
N:1	
	id (PK)
VOUCHERS	kontak
nama	
alamat	syarat_pembayaran
id (PK)	

```

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)

```

**kode (UNIK)**  
**tipe**  
 nilai  
 min\_pembelian  
 max\_penggunaan

dibuat\_pada

jumlah\_digunaka  
 n tanggal\_mulai  
 tanggal\_selesai  
 aktif  
 dibuat\_pada

KATEGORI\_BIAYA

1:N

BIAYA

id (PK)  
 nama  
 deskripsi  
 dibuat\_pada

deskripsi

id (PK)  
 category\_id (FK)  
 tanggal  
 jumlah  
 kwitansi  
 disetujui\_oleh (FK)  
 disetujui\_pada  
 dibuat\_pada

**Relasi Utama:** - categories → products : 1:N - products → transaction\_items : 1:N - transactions → transaction\_items : 1:N - users → transactions : 1:N (sebagai pelanggan & kasir) - vouchers → transactions : 1:N - suppliers → purchases : 1:N - purchases → purchase\_items : 1:N - expense\_categories → expenses : 1:N

#### 1.3.4 MODUL 4: AKUNTANSI

KATEGORI\_AKUN

id (PK)  
 nama  
**tipe**  
 dibuat\_pada

→ Aset, Liabilitas, Modal, Pendapatan, Biaya →  
 asset, liability, equity, revenue, expense

1:N

AKUN (COA)

**id**

BIGINT TANPA TANDA (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)

category_id	BIGINT UNSIGNED (FK)	→ account_categories.id →
kode	<b>VARCHAR(20) UNIK</b>	1101, 2301, 3101
nama	VARCHAR(255)	→ Kas, Hutang Bank, Modal
deskripsi	TEKS	
is_active	<b>BOOLEAN DEFAULT TRUE</b>	
created_at, updated_at	<b>TIMESTAMP</b>	

1:N

#### JOURNAL\_ENTRY\_LINES

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

N:1

#### JOURNAL\_ENTRIES

<b>id</b>	BIGINT UNSIGNED (PK)	
nomor_jurnal	<b>VARCHAR(50) UNIK</b>	→ JRN-20260117-0001
tanggal_transaksi	<b>TANG GAL</b>	
deskripsi	TEKS	
jenis_referensi	<b>VARCHAR(255)</b>	→ POLYMORPHIC
id_referensi	<b>NULLBIGINT UNSIGNED</b>	→ POLYMORPHIC
total_debit	<b>NULLDECIMAL(15,2)</b>	
total_kredit	<b>DECIMAL(15,2)</b>	
status	<b>ENUM ('draft','posted')</b>	
dibuat_oleh	<b>BIGINT UNSIGNED (FK)</b>	
diposting_oleh	<b>UNIQUE (FK)</b>	
diposting_pada	<b>NULLTIMESTAMP NULL</b>	
created_at, updated_at	<b>TIMESTAMP</b>	

N:1 (optional)

#### BANK\_TRANSACTIONS

<b>id</b>	BIGINT UNSIGNED (PK)
transaction_date	<b>TANG GAL</b>
deskripsi	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

debit	DECIMAL(15,2) DEFAULT 0	
kredit	DECIMAL(15,2) DEFAULT 0	
saldo	DECIMAL(15,2)	
id_jurnal_entri	<b>BIGINT UNSIGNED (FK) NULL</b>	→ journal_entries.id
status	ENUM ( 'pending' , 'matched' , 'reconciled' )	
catatan	TEKS	
dibuat_pada	<b>TIMESTAMP</b>	

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 (untuk rekonsiliasi)

### 1.3.5 MODUL 5: ORGANISASI & DOKUMEN

#### ASSET\_ORGANISASI

id	BIGINT UNSIGNED (PK)
nama	VARCHAR(255)
<b>kategori</b>	ENUM ( 'tanah' , 'bangunan' , 'kendaraan' , 'elektronik' , 'furniture' )
tanggal_pembelian	<b>TANG GAL</b>
harga_pembelian	DECIMAL(15,2)
nilai_sekarang	DECIMAL(15,2)
kondisi	ENUM( 'baik' , 'rusak' , 'hilang' )
lokasi	VARCHAR(255)
catatan	TEKS
dibuat_pada	<b>TIMESTAMP</b>

#### PERTEMUAN\_ORGANISASI

<b>id</b>	BIGINT TANPA TANDA (PK)
tanggal_pertemuan	<b>TANG GAL</b>
jenis_pertemuan	ENUM( 'pengurus' , 'anggota' , 'rat' )
agenda	TEKS
keputusan	TEKS
peserta	TEKS
catatan	TEKS
dibuat_oleh	BIGINT TIDAK TANDA (FK)
dibuat_pada	<b>TIMESTAMP</b>



## 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)

## PROFIL\_ORGANISASI

id	BIGINT TANPA TANDA (PK)
nama	VARCHAR(255)
posisi	VARCHAR(100)
periode_mulai	TANG GAL
periode_selesai	TANG GAL
telepon	VARCHAR(20)
foto	VARCHAR(255)
dibuat_pada	TIMESTAMP

## TEMPLATE\_DOKUMEN

id	BIGINT TANPA TANDA (PK)	
name	VARCHAR(255)	
type	ENUM('resmi', 'keanggotaan', 'pinjaman', 'lainnya')	
konten	LONGTEXT	→ template HTML
placeholder	JSON	→ ["nama", "tanggal"]
dibuat_pada	TIMESTAMP	

1:N (via jenis\_dokumen)

## DOKUMEN YANG DIHASILKAN

id	CHAR(36) (PK, UUID)	
nomor_dokumen	VARCHAR(50)	→ 001/UND/I/2026
jenis_dokumen	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	→ POLYMORPHIC
verified_at	NULLTIMESTAMP	
created_at	NULLTIMESTAMP	

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	

### 1.3.6 MODUL 6: KOMUNIKASI

#### PENGUMUMAN

<b>id</b>	BIGINT TIDAK TANDA
judul	(PK) VARCHAR (255)
konten	TEKS
gambar	<b>VARCHAR(255)</b>
aktif	<b>NULLBOOLEAN</b>
diterbitkan_pada	<b>DEFAULT TRUE</b>
dibuat_oleh	<b>TIMESTAMP NULL</b>
dibuat_pada	BIGINT UNSIGNED (FK)
	<b>TIMESTAMP</b>

#### POLLS

<b>id</b>	BIGINT UNSIGNED (PK)
judul	VARCHAR (255)
deskripsi	TEKS
tanggal_mulai	<b>TANG</b>
tanggal_selesai	<b>GAL</b>
is_active	<b>TANG</b>
created_by	<b>GAL</b>
created_at	<b>BOOLEAN DEFAULT TRUE</b>
	BIGINT UNSIGNED (FK)
	<b>TIMESTAMP</b>

1:N

#### POLL\_OPTIONS

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

→ **polls.id**

1:N

#### SUARA\_POLL

<b>id</b>	BIGINT TIDAK TANDA (PK)
id_opsi_poll	BIGINT TIDAK TANDA (FK)
id_pengguna	BIGINT TIDAK TANDA (FK)
waktu_memilih	<b>TIMESTAMP</b>

→ **poll\_options.id**  
→ **users.id**

#### 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)

#### ANGAN-ANGAN\_ANGGOTA

<b>id</b>	BIGINT TIDAK TANDA (PK)
<b>user_idkate gori</b>	BIGINT TIDAK TANDA (FK) ENUM('layanan', 'produk', 'keluhan', 'saran')
subjek	VARCHAR(255)
pesan	TEKS
status	ENUM('pending', 'ditinjau', 'resolved')
tanggapan_admin	<b>TEKS NULL</b>
dijawab_oleh	<b>BIGINT UNSIGNED (FK)</b>
dijawab_pada	<b>NULLTIMESTAMP</b>
dibuat_pada	<b>NULLTIMESTAMP</b>

---

### 1.3.7 MODUL 7: SISTEM

#### PENGATURAN (Kunci-Nilai)

<b>id</b>	BIGINT UNSIGNED (PK)
<b>keyva lue</b>	<b>VARCHAR(100) UNIK</b>
	TEKS
created_at	<b>CAP WAKTU</b>

#### LOG AUDIT

<b>id</b>	BIGINT TIDAK TANDA (PK)
id_penggun a tindakan	BIGINT TIDAK TANDA (FK)
model	NULLVARCHAR(50)
id_model	VARCHAR(255)
perubahan	<b>BIGINT UNSIGNED NULL</b>
alamat_ip	JSON
agen_pengguna	VARCHAR(45)
dibuat_pada	TEKS
	<b>TIMESTAMP</b>

→ **buat, perbarui, hapus**

→ Anggota, Pinjaman, dll

→ **Nilai sebelum/setelah**

#### NOTIFIKASI (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);
```

<b>id</b>	CHAR(36) (PK,	
<b>type</b>	UUID) VARCHAR	
<b>jenis_notifikasi</b>	(255) VARCHAR	→ Pengguna
<b>notifikasi_iddata</b>	(255) BIGINT	
	UNSIGNEDJSON	
dibaca_pada	<b>TIMESTAMP NULL</b>	
dibuat_pada	<b>TIMESTAMP</b>	

---

## 1.4 HUBUNGAN KUNCI ASING

### 1.4.1 Kunci Asing Kritis:

-- *Pengguna & Anggota*

```
ALTER TABLE anggota
    ADD CONSTRAINT fk_anggota_pengguna
    FOREIGN KEY (user_id) REFERENCES
    pengguna(id) ON DELETE CASCADE;
```

-- *Keuangan*

```
ALTER TABLE tabungan
    ADD CONSTRAINT fk_tabungan_anggota
    FOREIGN KEY (member_id) REFERENCES anggota(id);
```

```
ALTER TABLE pinjaman
    ADD CONSTRAINT fk_pinjaman_anggota
    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;
```

-- *Perdagangan*

```
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
    TAMBAH BATASAN fk_transaction_items_product KUNCI
    ASING (product_id) MENGACU PADA 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);

```

-- *Akuntansi*

```
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 INDEKS & OPTIMISASI

### 1.5.1 Kunci Utama:

Semua tabel memiliki id sebagai **BIGINT UNSIGNED AUTO\_INCREMENT PRIMARY**

### KEY1.5.2 Pembatasan Unik:

-- *Pengguna*

users.email (UNIQUE)

-- *Anggota*

members.user\_id (UNIQUE)

members.member\_id (UNIQUE)

members.employee\_id (UNIQUE)

-- *Produk*

products.barcode (UNIQUE)

-- *Akun*

accounts.code (UNIQUE)

-- *Pengaturan*

settings.key (UNIQUE)

-- *Dokumen*

document\_templates.name (UNIK per tipe)

generated\_documents.document\_number (UNIK)

### 1.5.3 Indeks Komposit:

-- *Untuk optimasi kinerja*

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
```

---

## 1.6 ATURAN INTEGRITAS DATA

### 1.6.1 Pembatasan:

#### 1. Validasi Saldo:

- `members.credit_used` `members.credit_limit`
- `journal_entries.total_debit` = `journal_entries.total_credit`

#### 2. Transisi Status:

- `loans.status`: pending → approved → active → completed
- `withdrawal_requests.status`: pending → approved → completed

#### 3. Logika Tanggal:

- `organization_profiles.period_end` > `period_start`
- `polls.end_date` > `start_date`

#### 4. Penghapusan Berantai:

- Hapus pengguna → hapus profil anggota
- Hapus pinjaman → hapus pembayaran\_pinjaman
- Hapus transaksi → hapus item\_transaksi
- Hapus jurnal\_entri → hapus garis\_jurnal\_entri

#### 5. Penghapusan Lunak:

- TIDAK DIGUNAKAN - Hapus keras dengan jejak log audit
- 

## 1.7 STATISTIK & KAPASITAS

Metrik	Nilai
Total Tabel	~65
Tabel dengan FK	~45
Total Indeks	~120+
Rata-rata	Rata-rata
Kolom per Tabel	Kolom per
Max	Tabel 8-12
Teks/JSON	15 tabel
Fields	Relasi Polimorfik 2 ( <code>journal_entries</code> , <code>generated_documents</code> )
Relasi Polimorfik	
Ukuran DB yang Diharapkan (1 tahun)	~500MB - 2GB
Tingkat Pertumbuhan yang Diharapkan	~100MB/tahun

---

## 1.8 STRATEGI CADANGAN

### Cadangan Harian Otomatis:

# *perintah Laravel*

`php artisan backup:run`

# *dump MySQL Manual*

`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

**Contact:** dev@kopkarskf.com

Kebijakan Retensi: - Cadangan harian: Simpan 30 hari - Cadangan mingguan: Simpan 3 bulan  
- Cadangan bulanan: Simpan 1 tahun

---

## 1.9 MANAJEMEN MIGRASI

Lokasi: database/migrations/

Total Migrasi: 65+ file

**Konvensi Penamaan:**

**YYYY\_MM\_DD\_HHMMSS\_nama\_deskriptif.php Jalankan Migrasi:**

*# Instalasi baru*

`php artisan migrate:fresh --seed`

*# Produksi (aman)*

`php artisan migrate`

*# Rollback batch terakhir*

`php artisan migrate:rollback`

*# Periksa status*

`php artisan migrate:status`

---

## 1.10 VERSI SKEMA

Versi Skema Saat Ini: 2.0

Terakhir Diperbarui: 17 Januari 2026

Perubahan Besar: - v1.0 (Des 2025): Skema awal - v1.5 (Jan 2026): Menambahkan tabel generator dokumen - v2.0 (Jan 2026): Modul akuntansi + rekonsiliasi bank

---

Pemelihara: Tim DatabaseKontak:  
dev@kopkarskf.com