Rakamin Academy X KALBE Nutritionals

[Task 5] Data Modeling, Warehouse Foundation and SQL Operation

Kalbe Nutritionals - DBA

Presented by
Raja Alamsyah Tahir

Raja Alamsyah Tahir

As a recent graduate in Computer Engineering with a deep interest in Data Analysis and Database Administration, I am actively seeking opportunities to further develop my skills and knowledge in this field.

My Experience

ETL Developer Intern – PT Bank Tabungan Neragara (Persero) Tbk

- Revamped the Extract, Transform, Load (ETL) infrastructure by leveraging IBM DataStage data integration for seamless integration of heterogeneous data sources.

Data Analyst Intern – ICT IPB University

- Collaborated proactively with the operations team to identify and implement potential improvements that simplified the administration process and increased efficiency.

Case Study

1. Lakukanlah normalisasi dari hasil pencatatan distribusi barang tersebut
2. Buatlah ERD berdasarkan hasil dari normalisasi data distribusi barang
○ Dapat menggunakan notasi Chen atau pun Crow’s foot
3. Buatlah database dan struktur table & relasi menggunakan RDBMS PostgreSQL
○ Buatlah struktur table tersebut di dalam schema yang bernama app
○ Untuk data produk, silahkan import dari file lampiran kedua
○ Buatlah sebuah user yang akan digunakan oleh backend programmer untuk melakukan operasi database dengan akses hanya dapat melakukan DML (INSERT, UPDATE, DELETE, SELECT)
○ Buatlah index di dalam table sesuai kebutuhan untuk mengoptimalkan query

Result

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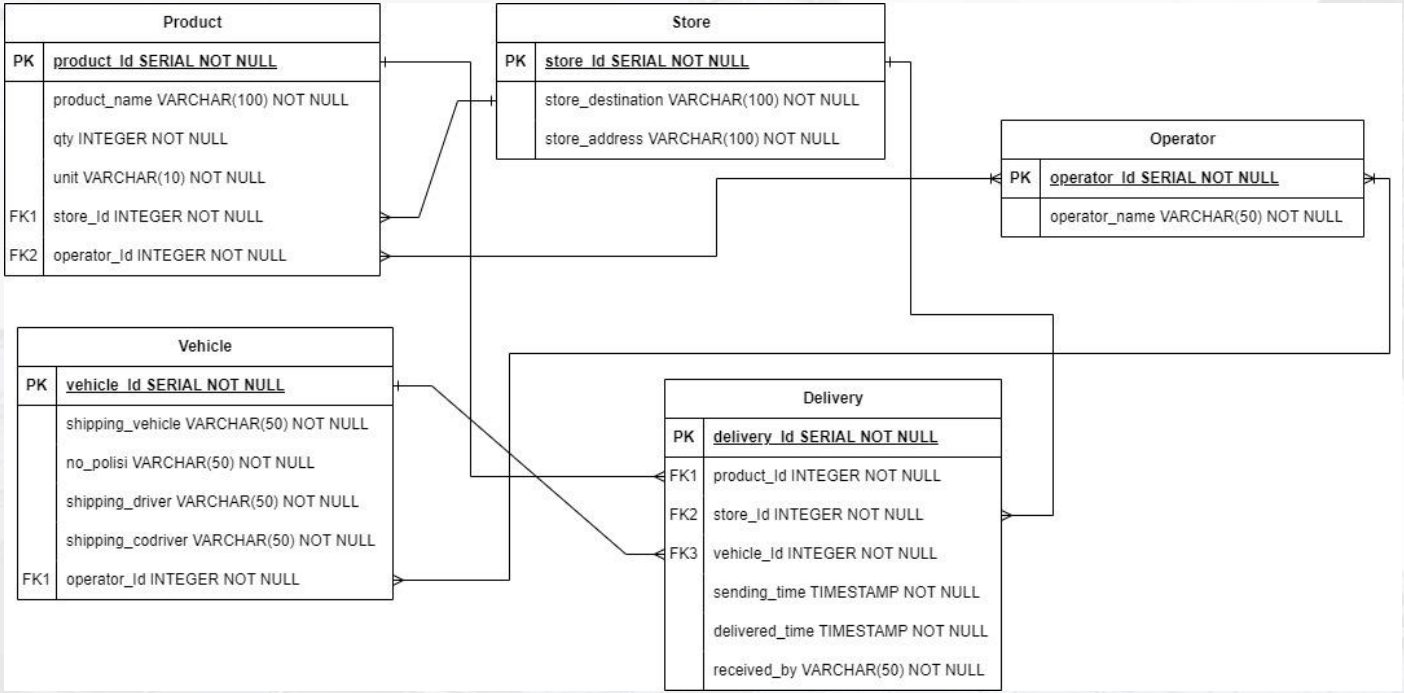
Membuat Normalisasi dan ERD Crow's Foot pada Distribusi Barang



Membuat tabel distribusi barang dan import data menggunakan file csv

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```
CREATE TABLE IF NOT EXISTS public.distribusi_barang (
    No INTEGER,
    Product_Name VARCHAR(100),
    Qty INTEGER,
    Unit VARCHAR(10),
    Store_Destination VARCHAR(100),
    Store_Address VARCHAR(100),
    Operator_Name VARCHAR(50),
    Shipping_Vehicle VARCHAR (50),
    No_Polisi VARCHAR (50),
    Shipping_Driver VARCHAR(50),
    Shipping_codriver VARCHAR(50),
    Sending_Time TIMESTAMP WITHOUT TIME ZONE,
    Delivered_Time TIMESTAMP WITHOUT TIME ZONE,
    Received_By VARCHAR(50)
);
```

	no integer	product_name character varying (100)	qty integer	unit character varying (10)	store_destination character varying (100)
1	1	Hydro Coco 250ml	5	box	Apotek Agus Sari
2	2	Hydro Coco Vita-D 330ml	5	box	Apotek Agus Sari
3	3	Milna Biskuit Bayi Apel	10	box	Apotek Agus Sari
4	4	Hydro Coco 250ml	3	box	Toko Maju Bersama
5	5	Hydro Coco 330ml	2	box	Toko Maju Bersama

```
copy distribusi_barang from
'E:\Daftar Kerja\Magang\Rakamin\Database Administrator - Kalbe\distribusi_barang.csv'
(format csv, null "NULL", DELIMITER ';', HEADER);

SELECT *
FROM distribusi_barang;
```

Membuat tabel data_produk dan import data menggunakan file csv

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```
CREATE TABLE IF NOT EXISTS public.data_produk (
    No INTEGER,
    Name VARCHAR(100)
);

copy data_produk from
'E:\Daftar Kerja\Magang\Rakamin\Database Administrator - Kalbe\data_produk.csv'
(format csv, null "NULL", DELIMITER ';', HEADER);

SELECT *
FROM data_produk;
```

	no integer	name character varying (100)
1	1	Hydro Coco 250ml
2	2	Hydro Coco 330ml
3	3	Hydro Coco 500ml
4	4	Hydro Coco 1 liter
5	5	Hydro Coco Vita-D 330ml
6	6	Milna Biskuit Bayi Original
7	7	Milna Biskuit Bayi Beras Merah
8	8	Milna Biskuit Bayi Kacang Hijau

Membuat schema app dan tabel hasil normalisasi distribusi barang

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```sql
CREATE TABLE app.product (
    product_id SERIAL PRIMARY KEY,
    product_name VARCHAR(100) NOT NULL,
    qty INTEGER NOT NULL,
    unit VARCHAR(10) NOT NULL,
    store_id INTEGER NOT NULL,
    operator_id INTEGER NOT NULL
);

CREATE TABLE app.store (
    store_id SERIAL PRIMARY KEY,
    store_destination VARCHAR(100) NOT NULL,
    store_address VARCHAR(100) NOT NULL
);

CREATE TABLE app.operator (
    operator_id SERIAL PRIMARY KEY,
    operator_name VARCHAR(50) NOT NULL
);
```

```sql
CREATE TABLE app.vehicle (
    vehicle_id SERIAL PRIMARY KEY,
    shipping_vehicle VARCHAR(50) NOT NULL,
    no_polisi VARCHAR(50) NOT NULL,
    shipping_driver VARCHAR(50) NOT NULL,
    shipping_codriver VARCHAR(50) NOT NULL,
    operator_id INTEGER NOT NULL
);

CREATE TABLE app.delivery (
    delivery_id SERIAL PRIMARY KEY,
    product_id INTEGER NOT NULL,
    store_id INTEGER NOT NULL,
    vehicle_id INTEGER NOT NULL,
    sending_time TIMESTAMP WITHOUT TIME ZONE NOT NULL,
    delivered_time TIMESTAMP WITHOUT TIME ZONE NOT NULL,
    received_by VARCHAR(50) NOT NULL
);
```

Membuat Foreign Key pada tiap tabel

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```
ALTER TABLE app.product
ADD CONSTRAINT FK_product_storeid
FOREIGN KEY (store_id)
REFERENCES app.store(store_id);

ALTER TABLE app.product
ADD CONSTRAINT FK_product_operatorid
FOREIGN KEY (operator_id)
REFERENCES app.operator(operator_id);

ALTER TABLE app.vehicle
ADD CONSTRAINT FK_vehicle_operatorid
FOREIGN KEY (operator_id)
REFERENCES app.operator(operator_id);
```

```
ALTER TABLE app.delivery
ADD CONSTRAINT FK_delivery_product
FOREIGN KEY (product_id)
REFERENCES app.product(product_id);

ALTER TABLE app.delivery
ADD CONSTRAINT FK_delivery_storeid
FOREIGN KEY (store_id)
REFERENCES app.store(store_id);

ALTER TABLE app.delivery
ADD CONSTRAINT FK_delivery_vehicleid
FOREIGN KEY (vehicle_id)
REFERENCES app.vehicle(vehicle_id);
```

Mengambil data dari public.distribusi_barang

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```
INSERT INTO app.store (store_destination, store_address)
SELECT DISTINCT store_destination, store_address
FROM public.distribusi_barang
ORDER BY store_destination;

SELECT *
FROM app.store;


INSERT INTO app.operator (operator_name)
SELECT DISTINCT operator_name
FROM public.distribusi_barang
ORDER BY operator_name;

SELECT *
FROM app.operator;
```

	store_id [PK] integer	store_destination character varying (100)	store_address character varying (100)
1	1	Apotek Agung	Pasar Senen no 301
2	2	Apotek Agus Sari	Jln Angga Jaya no 21
3	3	Toko Anak Sehat	Jln Imam Bonjol no 33
4	4	Toko Maju Bersama	Jln Agus Salim no 22

	operator_id [PK] integer	operator_name character varying (50)
1	1	Ahmad Agus
2	2	Fitrianto

Mengambil data dari public.distribusi_barang dan tabel lain

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```
INSERT INTO app.product (product_name, qty, unit, store_id, operator_id)
SELECT DISTINCT db.product_name, db.qty, db.unit, s.store_id, o.operator_id
FROM public.distribusi_barang db
INNER JOIN app.store s
    ON db.store_destination = s.store_destination
INNER JOIN app.operator o
    ON db.operator_name = o.operator_name
ORDER BY s.store_id, o.operator_id;

SELECT *
FROM app.product;
```

	product_id [PK] integer	product_name character varying (100)	qty integer	unit character varying (10)	store_id integer	operator_id integer
1	1	Entrasol Active Vanilla latte	5	box	1	2
2	2	Entrasol Gold Chocolate	6	box	1	2
3	3	Entrasol Gold Original	4	box	1	2
4	4	Hydro Coco 250ml	5	box	2	1
5	5	Hydro Coco Vita-D 330ml	5	box	2	1
6	6	Milna Biskuit Bayi Apel	10	box	2	1
7	7	Milna Bubur Organik Multigrain	10	box	3	2
8	8	Milna Nature Delight Apel Labu Wortel	5	box	3	2
9	9	Milna Nature Delight Apel Peach	10	box	3	2
10	10	Milna Rice Crackers Apple Orange	12	box	3	2
11	11	Entrasol Gold Original	8	box	4	1
12	12	Hydro Coco 250ml	3	box	4	1
13	13	Hydro Coco 330ml	2	box	4	1

Mengambil data dari public.distribusi_barang dan tabel lain

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```
INSERT INTO app.vehicle (shipping_vehicle, no_polisi, shipping_driver, shipping_codriver, operator_id)
SELECT DISTINCT db.shipping_vehicle, db.no_polisi, db.shipping_driver, db.shipping_codriver, o.operator_id
FROM public.distribusi_barang db
INNER JOIN app.operator o
    ON db.operator_name = o.operator_name
ORDER BY db.shipping_vehicle, operator_id;

SELECT *
FROM app.vehicle;
```

	vehicle_id [PK] integer	shipping_vehicle character varying (50)	no_polisi character varying (50)	shipping_driver character varying (50)	shipping_codriver character varying (50)	operator_id integer
1	1	Box A001	B 1234 GA	Dimas Ahmad	Andi Wahyu	1
2	2	Box A001	B 1234 GA	Ginanjar	Hari Saputra	2
3	3	Box A002	B 3214 JS	Hari Saputra	Dadang Bima	1

Mengambil data dari public.distribusi_barang dan tabel lain

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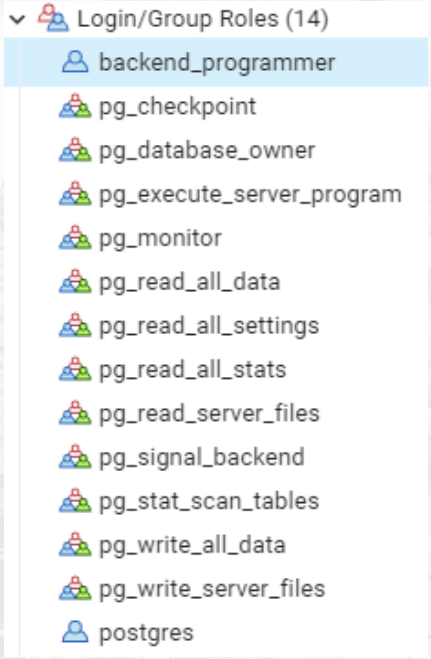
```
INSERT INTO app.delivery (product_id, store_id, vehicle_id, sending_time, delivered_time, received_by)
SELECT p.product_id, s.store_id, v.vehicle_id, db.sending_time, db.delivered_time, db.received_by
FROM public.distribusi_barang db
INNER JOIN app.product p
    ON db.product_name = p.product_name
INNER JOIN app.store s
    ON db.store_destination = s.store_destination
INNER JOIN app.vehicle v
    ON db.shipping_vehicle = v.shipping_vehicle
ORDER BY p.product_id,s.store_id,v.vehicle_id;

SELECT *
FROM app.delivery;
```

	delivery_id [PK] integer	product_id integer	store_id integer	vehicle_id integer	sending_time timestamp without time zone	delivered_time timestamp without time zone	received_by character varying (50)
1	1	1	1	1	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
2	2	1	1	1	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
3	3	1	1	2	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
4	4	1	1	2	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
5	5	2	1	1	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
6	6	2	1	1	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
7	7	2	1	2	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
8	8	2	1	2	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
9	9	3	1	1	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
10	10	3	1	1	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
11	11	3	1	2	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
12	12	3	1	2	2023-05-02 09:00:00	2023-05-02 14:00:00	Jamal
13	13	3	4	3	2023-05-01 11:00:00	2023-05-01 13:00:00	Eriawan
14	14	3	4	3	2023-05-01 11:00:00	2023-05-01 13:00:00	Eriawan
15	15	4	2	1	2023-05-01 10:00:00	2023-05-01 13:30:00	Dian Ayu

Membuat users untuk backend programmer

```
CREATE USER backend_programmer WITH ENCRYPTED PASSWORD 'kalbe123';
GRANT CONNECT ON DATABASE app TO backend_programmer;
GRANT USAGE ON SCHEMA app TO backend_programmer;
GRANT SELECT, INSERT, UPDATE, DELETE ON ALL TABLES IN SCHEMA app TO backend_programmer;
```



Membuat index pada tiap tabel

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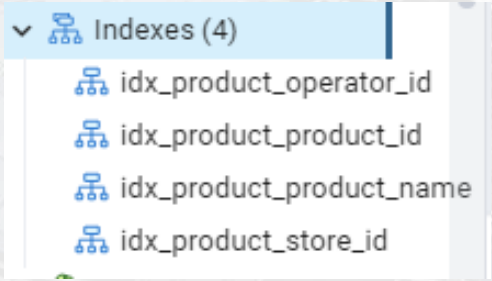
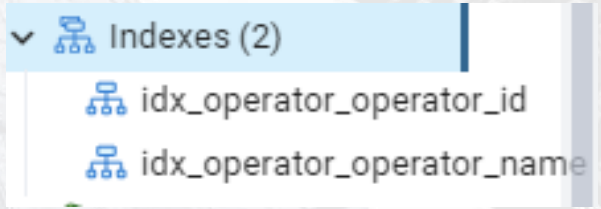
```
CREATE INDEX idx_product_product_id ON app.product (product_id);
CREATE INDEX idx_product_product_name ON app.product (product_name);
CREATE INDEX idx_product_store_id ON app.product (store_id);
CREATE INDEX idx_product_operator_id ON app.product (operator_id);

CREATE INDEX idx_store_store_id ON app.store (store_id);
CREATE INDEX idx_store_store_destination ON app.store (store_destination);

CREATE INDEX idx_operator_operator_id ON app.operator (operator_id);
CREATE INDEX idx_operator_operator_name ON app.operator (operator_name);
```

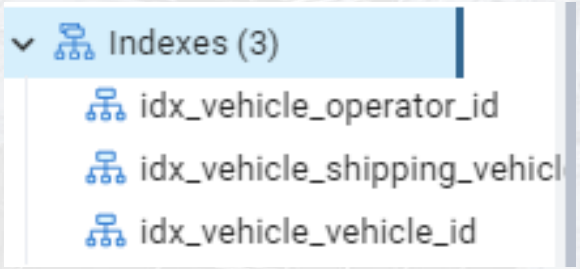


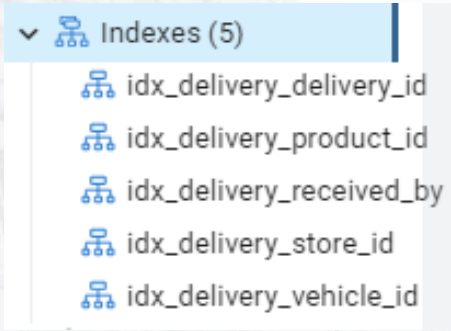


Membuat index pada tiap tabel

```
CREATE INDEX idx_vehicle_vehicle_id ON app.vehicle (vehicle_id);
CREATE INDEX idx_vehicle_shipping_vehicle ON app.vehicle (shipping_vehicle);
CREATE INDEX idx_vehicle_operator_id ON app.vehicle (operator_id);

CREATE INDEX idx_delivery_delivery_id ON app.delivery (delivery_id);
CREATE INDEX idx_delivery_product_id ON app.delivery (product_id);
CREATE INDEX idx_delivery_store_id ON app.delivery (store_id);
CREATE INDEX idx_delivery_vehicle_id ON app.delivery (vehicle_id);
CREATE INDEX idx_delivery_received_by ON app.delivery (received_by);
```





Case Study

4. Buatlah query untuk kebutuhan - kebutuhan di bawah ini
○ Menampilkan 2 driver dengan pengiriman terbanyak bulan Mei 2023
○ Menampilkan 10 barang paling sering dikirim di bulan Mei 2023
○ Menampilkan semua pengiriman yang belum selesai
5. Buatlah sebuah user defined function
○ Untuk membuat ID Shipment dengan format yymmddxxx (contoh: 230519001, 230519002)
6. Buatlah 2 buah stored procedure
○ Untuk membuat shipment baru
○ Untuk menambahkan product ke dalam shipment
7. Buatlah Daily Backup
○ Buatlah task / job untuk melakukan backup database pukul 23:00 setiap hari Daftarkan database tersebut ke dalam SolarWinds DPA
○ Buatlah alert ketika suatu query memiliki total waiting time sebesar 10 detik atau lebih

Result

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Menampilkan 2 driver dengan pengiriman terbanyak bulan Mei 2023

```sql
--Showing the 2 drivers with the most deliveries of May 2023

SELECT shipping_driver, COUNT(*) AS total_shipment
FROM public.distribusi_barang
WHERE EXTRACT(MONTH FROM delivered_time) = 5 AND EXTRACT(YEAR FROM delivered_time) = 2023
GROUP BY shipping_driver
ORDER BY total_shipment DESC
LIMIT 2;
```

	shipping_driver character varying (50)	total_shipment bigint
1	Ginanjar	14
2	Dimas Ahmad	6

Menampilkan 10 barang paling sering dikirim di bulan Mei 2023

```sql
SELECT product_name, SUM(qty) AS total_qty
FROM public.distribusi_barang
WHERE EXTRACT(MONTH FROM delivered_time) = 5 AND EXTRACT(YEAR FROM delivered_time) = 2023
GROUP BY product_name
ORDER BY total_qty DESC
LIMIT 10;
```

	product_name character varying (100)	total_qty bigint
1	Entrasol Gold Original	24
2	Milna Rice Crackers Apple Orange	24
3	Milna Biskuit Bayi Apel	20
4	Milna Nature Delight Apel Peach	20
5	Milna Bubur Organik Multigrain	20
6	Hydro Coco 250ml	16
7	Entrasol Gold Chocolate	12
8	Hydro Coco Vita-D 330ml	10
9	Entrasol Active Vanilla latte	10
10	Milna Nature Delight Apel Labu Wortel	10

Menampilkan 10 barang paling sering dikirim di bulan Mei 2023

```
SELECT *
FROM public.distribusi_barang
WHERE delivered_time IS NULL;
```

	no integer	product_name character varying (100)	qty integer	unit character varying (10)	store_destination character varying (100)	store_address character varying (100)	operator_name character varying (50)

Membuat ID Shipment dengan format yymmddxxx (contoh: 230519001, 230519002)

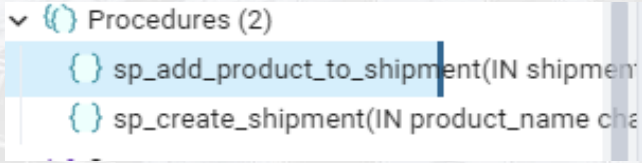
```
SELECT TO_CHAR(sending_time, 'YYMMDD') || LPAD(ROW_NUMBER() OVER
    (ORDER BY sending_time)::TEXT, 3, '0') AS shipment_id
FROM public.distribusi_barang;
```

	shipment_id text
1	230501001
2	230501002
3	230501003
4	230501004
5	230501005
6	230501006
7	230501007
8	230501008
9	230501009
10	230501010

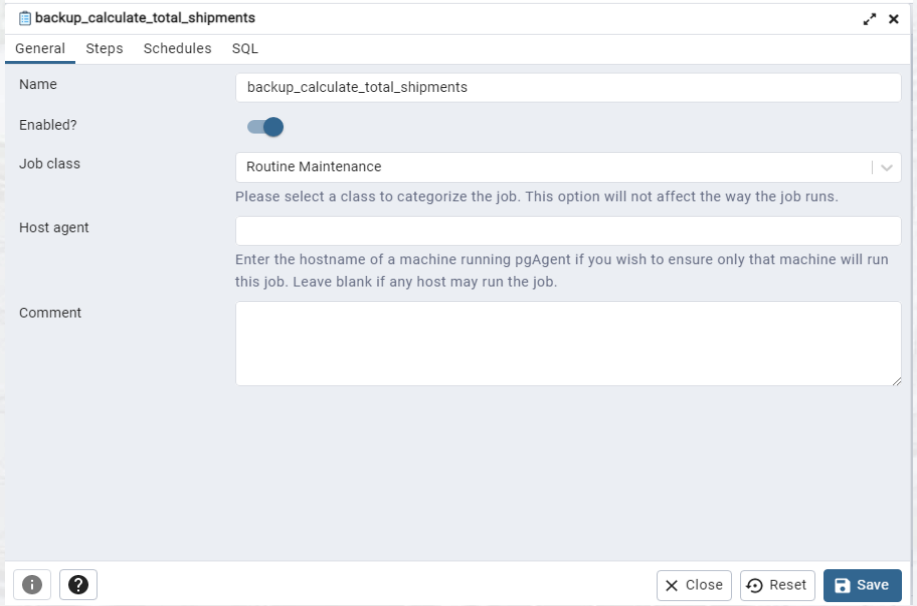
Membuat shipment baru dan menambahkan product ke dalam shipment

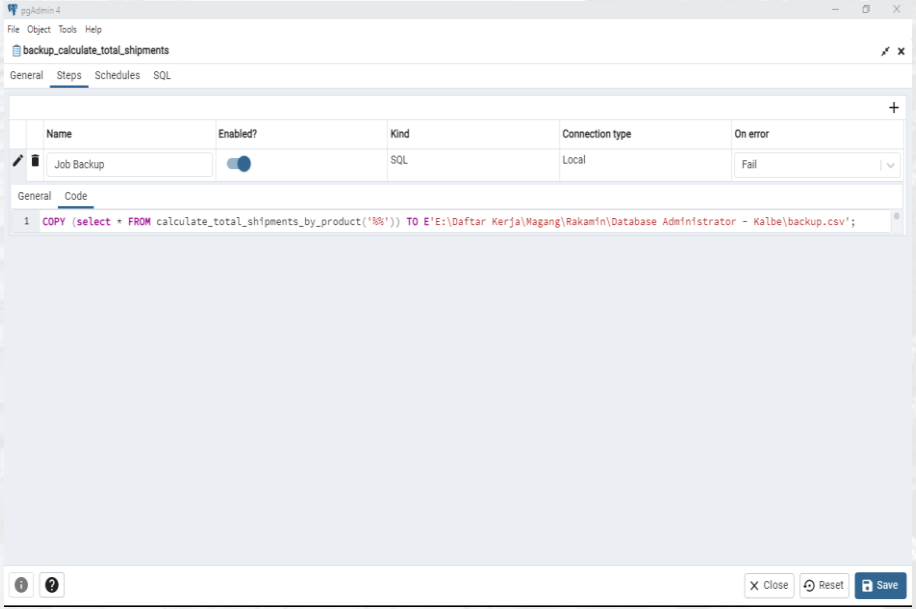
```
CREATE OR REPLACE PROCEDURE sp_create_shipment(
    IN product_name VARCHAR(100),
    IN qty INTEGER,
    IN unit VARCHAR(10),
    IN store_destination VARCHAR(100),
    IN store_address VARCHAR(100),
    IN operator_name VARCHAR(50),
    IN shipping_vehicle VARCHAR(50),
    IN no_polisi VARCHAR(50),
    IN shipping_driver VARCHAR(50),
    IN shipping_codriver VARCHAR(50),
    IN sending_time TIMESTAMP WITHOUT TIME ZONE,
    IN delivered_time TIMESTAMP WITHOUT TIME ZONE,
    IN received_by VARCHAR(50)
)
LANGUAGE plpgsql
AS $$
BEGIN
    INSERT INTO public.distribusi_barang ("product_name", "qty", "unit", "store_destination",
        "store_address", "operator_name", "shipping_vehicle", "no_polisi", "shipping_driver",
        "shipping_codriver", "sending_time", "delivered_time", "received_by")
    VALUES (product_name, qty, unit, store_destination, store_address, operator_name,
        shipping_vehicle, no_polisi, shipping_driver, shipping_codriver, sending_time,
        delivered_time, received_by);
END;
$$;
```

```
CREATE OR REPLACE PROCEDURE sp_add_product_to_shipment(
    IN shipment_id bigint,
    IN product_name character varying,
    IN qty integer,
    IN unit character varying
)
LANGUAGE plpgsql
AS $$
BEGIN
    INSERT INTO app.distribusi_barang ("shipment_id", "product_name", "qty", "unit")
    VALUES (shipment_id, product_name, qty, unit);
END;
$$;
```

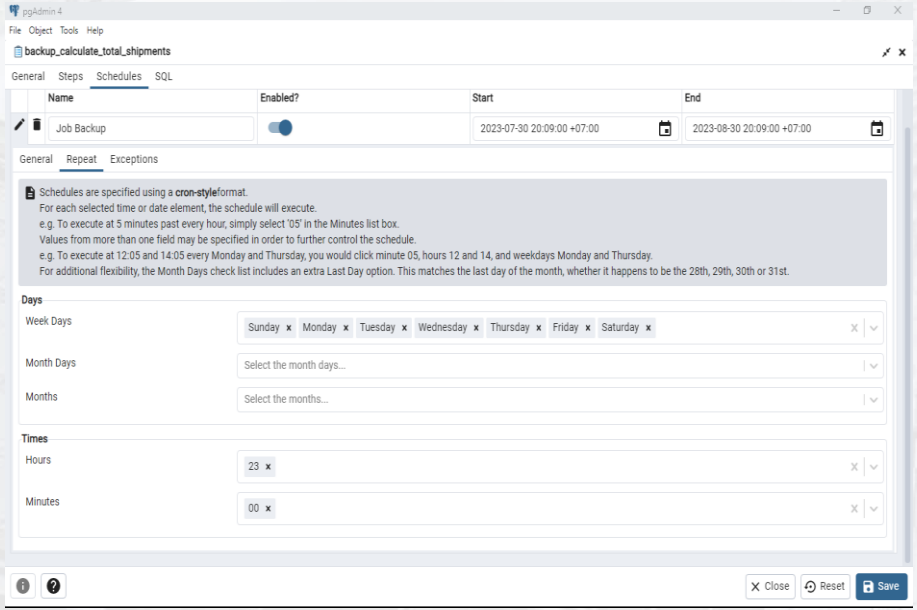


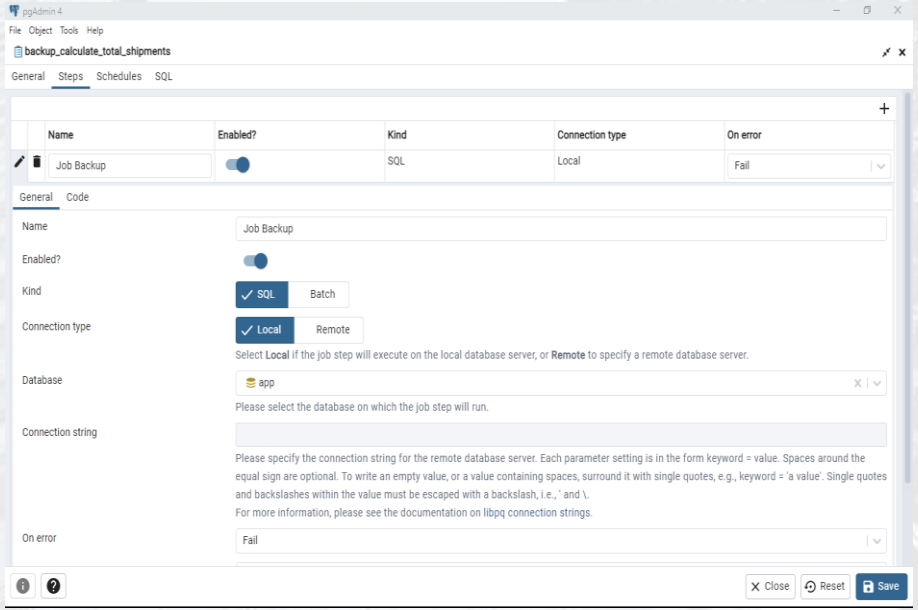
Buatlah task / job untuk melakukan backup database pukul 23:00 setiap hari Daftarkan database tersebut ke dalam SolarWinds DPA



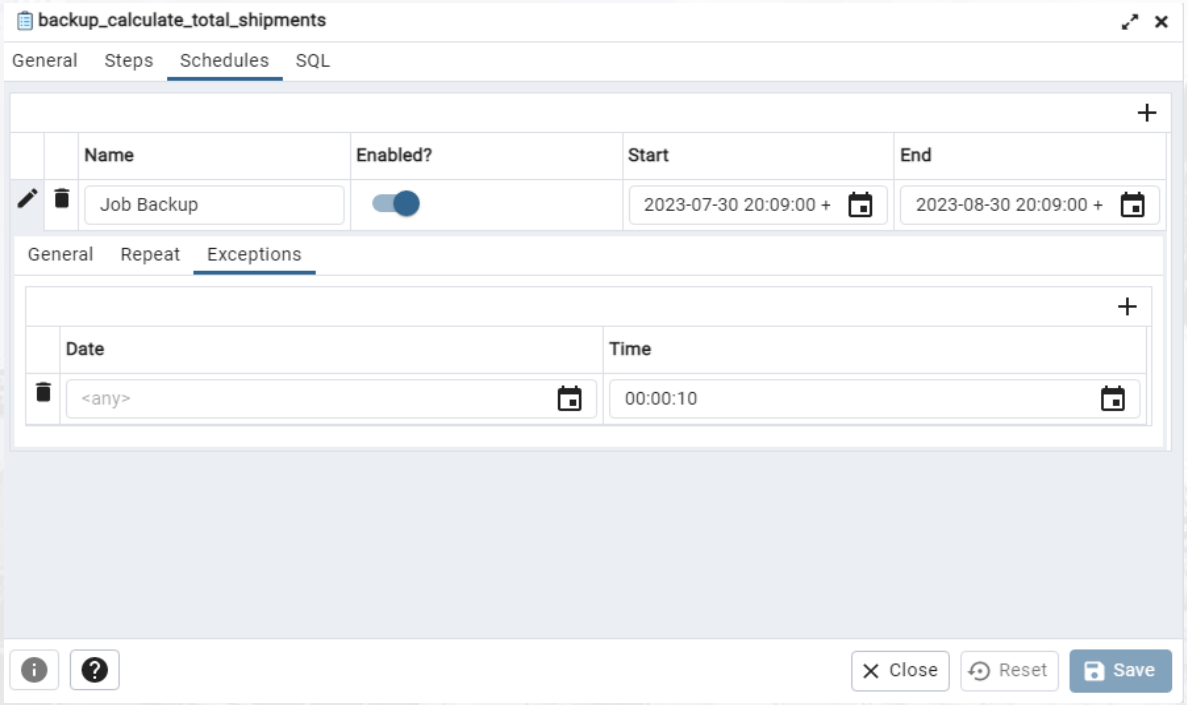


Buatlah task / job untuk melakukan backup database pukul 23:00 setiap hari menggunakan PG Agent





Buatlah alert ketika suatu query memiliki total waiting time sebesar 10 detik atau lebih



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Link Github

https://github.com/rajaalamsyah85/FinalTask_Kalbe_DBA

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Video Presentation

https://drive.google.com/drive/folders/1U4ayb6m6JmlTsZPEBUlyCjmHptAYAKa6?hl=id

Thank You