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Кафедра інформаційних систем та технологій

Лабораторна робота №3

з дисципліни «Технології розробки вбудованих систем IoT»

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1) Git repo: <https://github.com/Aristocrab/Labs>

2) Клас адаптеру та метод `save_data`

```
import pydantic_core
import requests
from app.entities.processed_agent_data import ProcessedAgentData
from app.interfaces.store_gateway import StoreGateway
import logging
from typing import List

class StoreApiAdapter(StoreGateway):
    def __init__(self, api_base_url):
        self.api_base_url = api_base_url

    def save_data(self, processed_agent_data_batch: List[ProcessedAgentData]):
        try:
            # Prepare the data as a list of dictionaries
            data = []
            for item in processed_agent_data_batch:
                # Convert datetime to ISO 8601 format string
                timestamp_isoformat = item.agent_data.timestamp.isoformat()
                # Create a dictionary with timestamp as string
                data_item = item.model_dump()
                data_item['agent_data']['timestamp'] = timestamp_isoformat
                data.append(data_item)

            # Make the POST request
            response = requests.post(f"{self.api_base_url}/processed_agent_data/",
                                     json=data)

            # Check if the request was successful (status code 200)
            if response.status_code == 200 or response.ok:
                return True
            else:
```

```

        return False
    except Exception as e:
        logging.info(f"Error occurred {e}")
        return False

```

3) Swagger, MQTT та Pg Admin

Початковий стан в pgAdmin:

The screenshot shows the pgAdmin 4 web interface in a browser. The left sidebar displays the database structure, with the 'processed_agent_data' table selected under the 'public' schema. The main panel shows a query window with the following SQL:

```

1 SELECT * FROM public.processed_agent_data
2 ORDER BY id ASC

```

Below the query window, the 'Data Output' tab displays the results of the query in a table format. The table has 10 columns: id, road_state, user_id, x, y, z, latitude, longitude, and timestamp. The data is as follows:

id	road_state	user_id	x	y	z	latitude	longitude	timestamp
1	1	string	1	0	0	0	0	2024-03-10 15:08:53.776
2	2	asdsad	15645	0	0	0	0	2024-03-10 15:08:53.776
3	3	string	0	0	5	0	0	2024-03-10 18:41:11.25
4	4	asdsad	1234	0	0	0	0	2024-03-10 15:08:53.776

The bottom status bar indicates the current location: Servers > PostgreSQL > Databases > test_db > Schemas > public > Tables > processed_agent_data. The status is 'Ln 1, Col 1'.

Swagger:

default

POST /processed_agent_data/ Save Processed Agent Data

Parameters

Cancel

Reset

No parameters

Request body required

application/json

```
{  "road_state": "ha-ha unique :D",  "agent_data": {    "user_id": 25,    "accelerometer": {      "x": 0,      "y": 0,      "z": 0    },    "gps": {      "latitude": 0,      "longitude": 0    },    "timestamp": "2024-03-10T19:07:13.293Z"  } }
```

Servers

These operation-level options override the global server options.

/

Execute

Responses

Curl

```
curl -X 'POST' \  'http://127.0.0.1:9000/processed_agent_data/' \  -H 'accept: application/json' \  -H 'content-type: application/json' \  -d '{  "road_state": "ha-ha unique :D",  "agent_data": {    "user_id": 25,    "accelerometer": {      "x": 0,      "y": 0,      "z": 0    },    "gps": {      "latitude": 0,      "longitude": 0    },    "timestamp": "2024-03-10T19:07:13.293Z"  } }'
```

Request URL

http://127.0.0.1:9000/processed_agent_data/

Server response

Code	Details
200	<div>Response body<div><pre>{ "status": "ok" }</pre><div>Download</div></div><div>Response headers<div>content-length: 15 content-type: application/json date: Sun, 10 Mar 2024 19:15:19 GMT server: uvicorn</div></div></div>

pgAdmin:

pgAdmin

FileObjectToolsHelp

localhost:5050/browser/

admin@admin.com (internal)

Object Explorer

Collations

Domains

FTS Configurations

FTS Dictionaries

FTS Parsers

FTS Templates

Foreign Tables

Functions

Materialized Views

Operators

Procedures

Sequences

Tables (1)

processed_agent_data

Columns

Constraints

Indexes

RLS Policies

Rules

Triggers

Trigger Functions

Types

Views

Subscriptions

Login/Group Roles

DashboardPropertiesSQLStatisticsDependenciesDependents

public.processed_agent_data/test_db/user@PostgreSQL

Query

Query History

Scratch Pad

1 SELECT * FROM public.processed_agent_data

2 ORDER BY id ASC

Data Output

Messages

Notifications

	id [PK] integer	road_state character varying (255)	user_id integer	x double precision	y double precision	z double precision	latitude double precision	longitude double precision	timestamp timestamp without time zone
1	1	string	1	0	0	0	0	0	2024-03-10 15:08:53.776
2	2	asdsad	15645	0	0	0	0	0	2024-03-10 15:08:53.776
3	3	string	0	0	5	0	0	0	2024-03-10 18:41:11.25
4	4	asdsad	1234	0	0	0	0	0	2024-03-10 15:08:53.776
5	5	ha-ha unique :D	25	0	0	0	0	0	2024-03-10 19:07:13.293

Servers > PostgreSQL > Databases > test_db > Schemas > public > Tables > processed_agent_data

Ln 1, Col 1

MQTT:

MQTT Explorer

ApplicationEditView

MQTT Explorer

Search...

DISCONNECT

127.0.0.1

51 topics, 1431 messages

processed_data_topic = {"road_state": "string", "agent_data": {"user_id": 0, "accelerometer": {"x": 0, "y": 5, "z": 0}, "gps": {"latitude": 0, "longitude": 0, "timestamp": "2024-03-10T18:41:11.250Z"}}

Value

Publish

Topic

processed_data_topic

rawxmljson

raw

xml

json

PUBLISH

QoS 0

retain

History

processed_data_topic

{ "road_state": "string", "agent_data": {

Бачимо оновлену історію

MQTT Explorer

127.0.0.1

SSYS (51 topics, 1478 messages)

processed_data_topic = {"road_state": "more unique than unique", "agent_data": {"user_id": 0, "accelerometer": {"x": 10, "y": 5, "z": 20}, "gps": {"

raw xml json

PUBLISH

QoS 0 retain

History

```
{
  "road state": "more unique than unique",
  "agent_data": {
    "user_id": 0,
    "accelerometer": {
      "x": 10,
      "y": 5,
      "z": 20
    },
    "gps": {
      "latitude": 50,
      "longitude": 50
    }
  },
  "timestamp": "2024-03-10T18:41:11.250Z"
}
```

Stats

pgAdmin:

localhost:5050/browser/

pgAdmin

Object Explorer

- Collations
- Domains
- FTS Configurations
- FTS Dictionaries
- FTS Parsers
- FTS Templates
- Foreign Tables
- Functions
- Materialized Views
- Operators
- Procedures
- Sequences
- Tables (1)
 - processed_agent_data
 - Columns
 - Constraints
 - Indexes
 - RLS Policies
 - Rules
 - Triggers
 - Trigger Functions
 - Types
 - Views
 - Subscriptions
 - Login/Group Roles
 - Tablespaces

Dashboard x Properties x SQL x Statistics x Dependencies x Dependents x public.processed_agent_data/test_db/user@PostgreSQL x

public.processed_agent_data/test_db/user@PostgreSQL

No limit

Query Query History

Scratch Pad x

```
1 SELECT * FROM public.processed_agent_data
2 ORDER BY id ASC
```

Data Output Messages Notifications

id	road_state	user_id	x	y	z	latitude	longitude	timestamp
[PK] integer	character varying (255)	integer	double precision	double precision	double precision	double precision	double precision	timestamp without time zone
1	string	1	0	0	0	0	0	2024-03-10 15:08:53.776
2	asdsad	15645	0	0	0	0	0	2024-03-10 15:08:53.776
3	string	0	0	5	0	0	0	2024-03-10 18:41:11.25
4	asdsad	1234	0	0	0	0	0	2024-03-10 15:08:53.776
5	ha-ha unique :D	25	0	0	0	0	0	2024-03-10 19:07:13.293
6	more unique than unique	0	10	5	20	50	50	2024-03-10 18:41:11.25

Total rows: 6 of 6 Query complete 00:00:00.087 Ln 1, Col 1

Висновок:

Під час виконання даної лабораторної роботи проведено ознайомлення з поняттям адаптерів у Python та їх застосуванням. Реалізовано клас `StoreApiAdapter`, який наслідує `StorageGateway` та імплементує його метод `save_data` для збереження обробленої інформації.