ICE Global

Golang Developer Assignment

Thank you for your interest in the Senior Back-End Developer (Golang) position at ICE Global.
As the first step of our hiring process, we invite you to complete the following technical assignment.
This task is designed to help us better understand your engineering skills, problem-solving abilities, and development approach.
We appreciate your time and effort, and we look forward to reviewing your work!

Prerequisites

To complete this task, please ensure the following tools are available in your development environment:

- Docker
- Docker Compose
- Make
- Go (version 1.23 or newer)

You will be required to configure your environment from scratch and develop all necessary code and scripts independently.

Assignment Overview

1. Todo Service (MySQL + Redis Stream)

You will build a service to manage TodoItem entities with the following structure:

- id (UUID)
- description (string)
- dueDate (timestamp)

The service must:

1. Store TodoItem data in a MySQL database
2. Send the created TodoItem to a Redis stream

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2. Create TodoItem

- Add a /todo endpoint to accept new TodoItem creation requests
- Save the item in **MySQL** and forward it to the **Redis stream**
- Return the created item in the response

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3. Clean Architecture

- Use **Clean Architecture** principles to organize the project into distinct layers:
  - **Entities**, **Use Cases**, **Interfaces**, and **Infrastructure**
- Ensure domain logic remains independent of frameworks and external services
- Implement **dependency inversion** and clearly separate concerns across layers
- External services like Redis Stream must be **accessed via interfaces**, allowing for mocking during tests

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4. Redis Stream Integration

- After creating a TodoItem, push its data into a **Redis stream**
- Wrap all Redis Stream operations behind a **well-defined interface**, allowing for easy mocking in tests

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5. Docker Setup

- Provide a docker-compose.yml file that configures:
  - **MySQL**
- Include a Makefile with a make run command to bring up the services

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6. Unit Testing

- Write unit tests for the following:
    - TodoItem creation and persistence in MySQL
    - Message publishing to Redis Stream
- Use mocks for Redis Stream so tests are isolated from external services
- Redis operations must be abstracted behind interfaces and tested with mock implementations

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Mocking External Services

- Use tools like gomock or mockery to generate mock implementations
- Mock the following service:
    - Redis Stream for simulating message publishing
- Ensure your code design allows injecting these mocks via interfaces for test coverage

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Bonus Points / What We Consider a Plus:

- Good Error and Response Handling
- Consistency Between Database and Redis Stream
- Strong Validation Across Layers

Expected Deliverables

A GitHub repository with the complete source code, including:

- Full Docker Compose setup for MySQL
- Unit tests

- A Makefile with the following commands:
    - make run: Start the project
    - make test: Run unit tests
    - make benchmark: Run performance benchmarks

Note

- You are expected to follow Clean Architecture principles as closely as possible, but we don't expect perfection. Clear separation of domain logic and infrastructure is the main goal.

- This assignment is intended solely to evaluate your technical capabilities. It will not be used in production or for any commercial purpose.

Good luck!