Setup Guide - HyperAccel LLM Chatbot

Prerequisite

Before launching, ensure you meet the following requirements:

1. **Hugging Face Account**
   - You must have an active Hugging Face account. You can create one at https://huggingface.co/join.
2. **Hugging Face Access Token**
   - Obtain a personal access token from Hugging Face. This token is required to download and use models from the Hugging Face Hub.
   - Generate a token at https://huggingface.co/settings/tokens
3. **Model Access Permissions (for gated models)**
   - If you plan to use gated models such as LLaMA, HyperCLOVA X, ensure that your Hugging Face account has been granted permission to access them.
   - Visit the model's page on Hugging Face and request access if needed.

Quick Start

1. Launch an F2 Instance

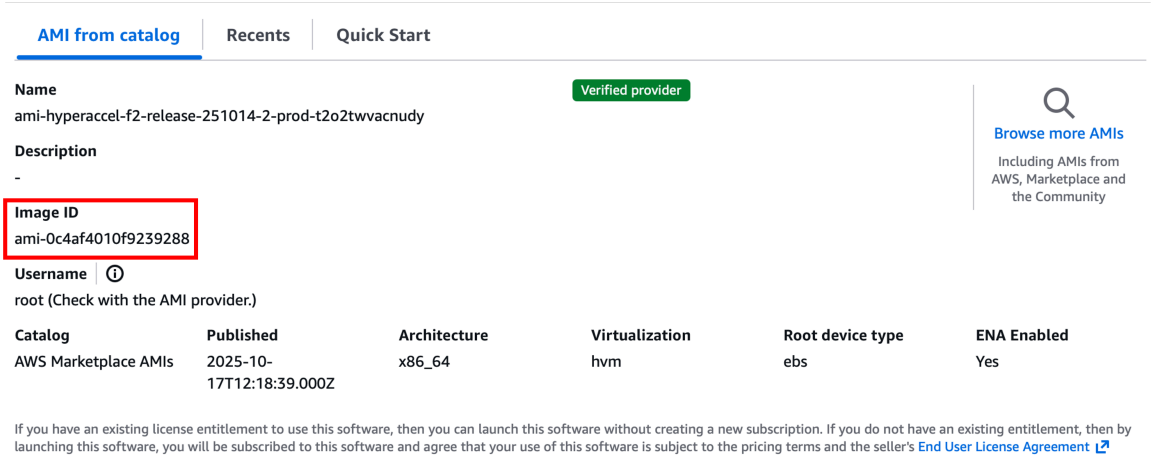
Use the following configuration to launch your EC2 instance:

- **Region**: us-east-1[US East (N. Virginia)], us-west-2[US West (Oregon)], eu-west-2[Europe (London)], ap-southeast-2[Asia Pacific (Sydney)]
- **AMI ID**:
  select AMI ID according to your region

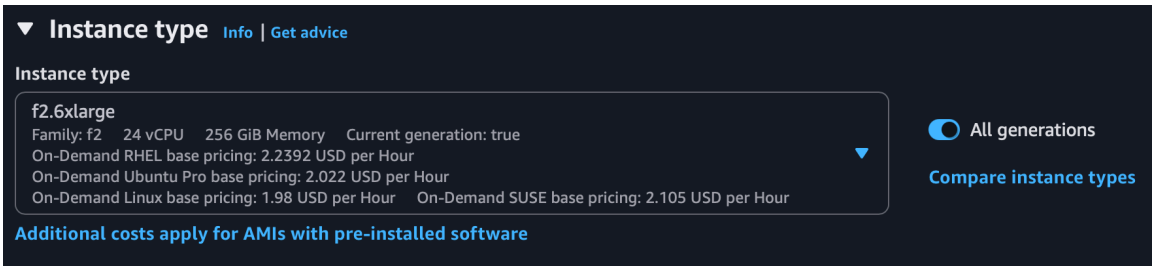
Region	AWS Name	AMI ID
us-east-1	US East (N. Virginia)	ami-0c4af4010f9239288

Region	AWS Name	AMI ID
us-west-2	US West (Oregon)	ami-05dcc91b7421149d4
ap-southeast-2	Asia Pacific (Sydney)	ami-0c7a04a703f31254d
eu-west-2	Europe (London)	ami-0e61771b9f0775d55

us-east-1 example



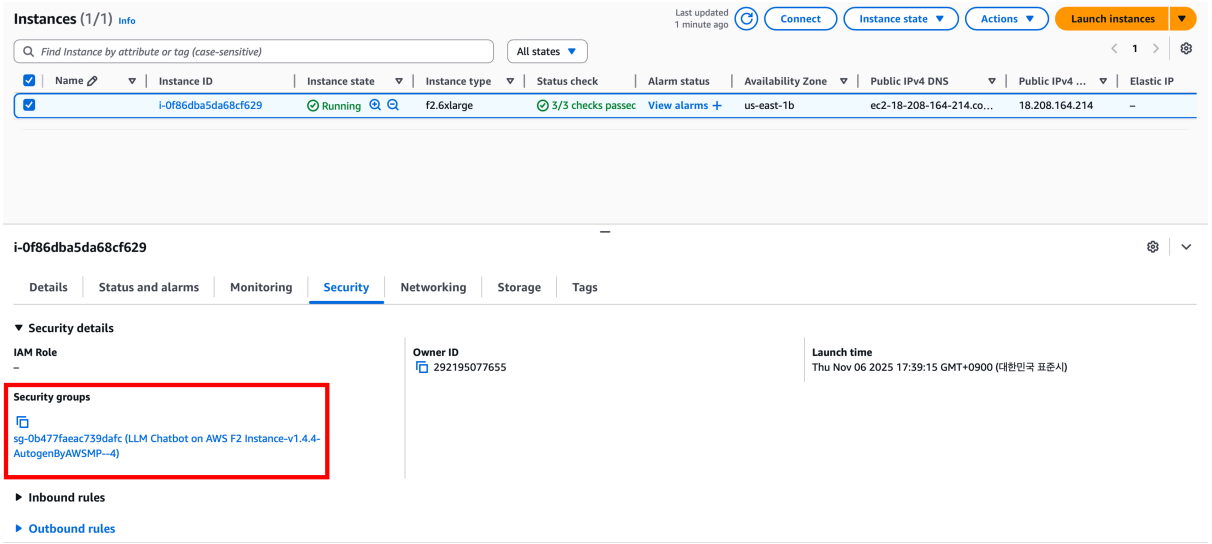
- **Instance Type**: f2.6xlarge



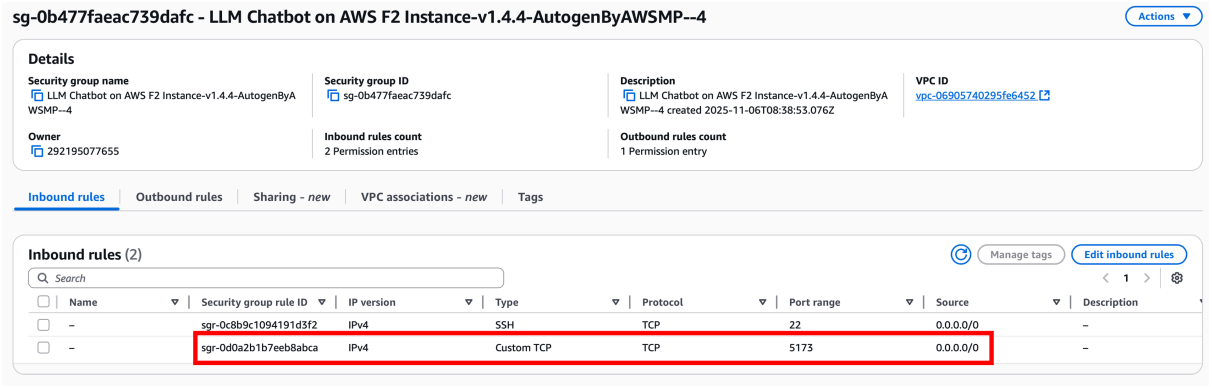
After launching the instance, check the following inbound rules in the security tab:

- **Port 22** (TCP protocol): SSH access
- *Port 5173 (**TCP protocol): Chat UI frontend server access
- **Source - 0.0.0.0/0** (applies to all ports, allowing access from any IP address)

Go to instances and select Security



Check if Port 5173 is open



if Port 5173 is missing, go to Troubleshooting B. Port 5173 is not found

2. Run Backend Server (vLLM)

Notice : Please proceed following steps in a new terminal

run the following commands step by step:

Launch the Docker container

```
>>> set_container
```

Set Huggingface token

```
>>> export HF_TOKEN="<huggingface_token>"
```

Activate the virtual environment

```
>>> cd /workspace/dev/Projects/vllm-orion
>>> source .venv/bin/activate
```

Set environment variables for F2

```
>>> set-f2-env
```

Load the FPGA bitstream

```
>>> load-f2-bitstream
```

Start vllm server

(For example, use: vllm serve LGAI-EXAONE/EXAONE-3.5-2.4B-Instruct --config config/config.yaml)

Notice : model setup takes a few minutes

```
>>> vllm serve <huggingface_model_name> --config config/config.yaml
```

3. Run Frontend Server (Chat UI)

Notice : You need to proceed this step in a new terminal

```
# This step doesn't need to use docker container.

>>> cd ~/Projects/HyperDex-Container/hyperaccel-chat-ui
>>> npm run dev -- --host                # Start the frontend server
```

Functional Test

1. Backend Server Only

Notice : You need to proceed this step in a new terminal

To verify the backend is working properly, run the following test command in your terminal:

- Test command:

```
>>> curl <http://localhost:8000/v1/completions> \\
  -H "Content-Type: application/json" \\
  -d '{"model": "LGAI-EXAONE/EXAONE-3.5-2.4B-Instruct", "prompt": "Wh
o are you?", "max_tokens": 30, "temperature": 1  }'
```

- Expected output:


```
{"id":"cmpl-<id>","object":"text_completion","created":<num>,"model":"LG
AI-EXAONE/EXAONE-3.5-2.4B-Instruct","choices":[{"index":0,"text":"\\n\\n
Options:\\n-  a scientist\\n-  a farmer\\n-  you\\n-  athlete\\n-  a schoolbo
y/","logprobs":null,"finish_reason":"length","stop_reason":null,"prompt_logp
robs":null}],"usage":{"prompt_tokens":4,"total_tokens":34,"completion_toke
ns":30,"prompt_tokens_details":null},"kv_transfer_params":null}
```


2. Frontend Server Connection Test

To verify frontend webpage is connected to server, check if we can reach to port 5173

- Test Command

  ```
  nc -zv <F2_instance_public_IPv4_address> 5173
  ```

- Expected output

  ```
  Connection to <F2_instance_public_IPv4_address> 5173 port [tcp/*] su
  cceeded!
  ```

3. Backend + Frontend Server Test

To test both backend and frontend servers together:

1. Open the Chat UI in a web browser:

```
http://<F2_instance_public_IPv4_address>:5173/
```

2. In the Chat UI, enter a prompt into the “Ask anything” input box at the bottom of the screen, and press Enter.
   - Example Input:

```
Who are you?
```

   - Expected Output:

```
I am an artificial intelligence designed to assist and communicate with u
sers like yourself. My goal is to provide helpful information, engage in c
onversations, and support tasks across a wide range of topics. How ma
y I assist you today? If you have any specific questions or need informa
tion on particular subjects, feel free to ask!
```

How to Change Large Language Models?

To switch to a different Hugging Face model, follow these steps:

1. When starting the backend server, replace <huggingface_model_name> with the new model you want to use.

```
>>> vllm serve <huggingface_model_name> --config config/config.ya
ml
```

2. Edit the .env.local file in the Chat UI project directory and change the "name" field to match the new model.

```
# File: ~/Projects/HyperDex-Container/hyperaccel-chat-ui/.env.local

MODELS=[
 {
  "name": "<huggingface_model_name>",
  "parameters": {
   "temperature": 1.0,
```

```
    "truncate_prompt_tokens": 256
   },
   "endpoints": [
    {
     "baseURL": "<http://127.0.0.1:8000/v1>",
     "type": "openai"
    }
   ]
  }
]
```

Replace <huggingface_model_name> with the name of your new model.

3. After updating the configuration, restart the Chat UI server:

```
>>> cd ~/Projects/HyperDex-Container/hyperaccel-chat-ui
>>> npm run dev -- --host
```

Now your Chat UI is connected to the new model.

Supported Large Language Models

(Replace <huggingface_model_name> with one of the following models)

You can use any of the models listed below by replacing <huggingface_model_name> in the command or configuration files:

- meta-llama/Llama-3.1-8B-Instruct
- meta-llama/Llama-3.2-1B-Instruct
- meta-llama/Llama-3.2-3B-Instruct
- naver-hyperclovax/HyperCLOVAX-SEED-Text-Instruct-0.5B
- naver-hyperclovax/HyperCLOVAX-SEED-Text-Instruct-1.5B
- LGAI-EXAONE/EXAONE-3.5-2.4B-Instruct
- LGAI-EXAONE/EXAONE-3.5-7.8B-Instruct

Be sure to use the full model name exactly as shown above when configuring your backend and frontend settings.

TroubleShooting

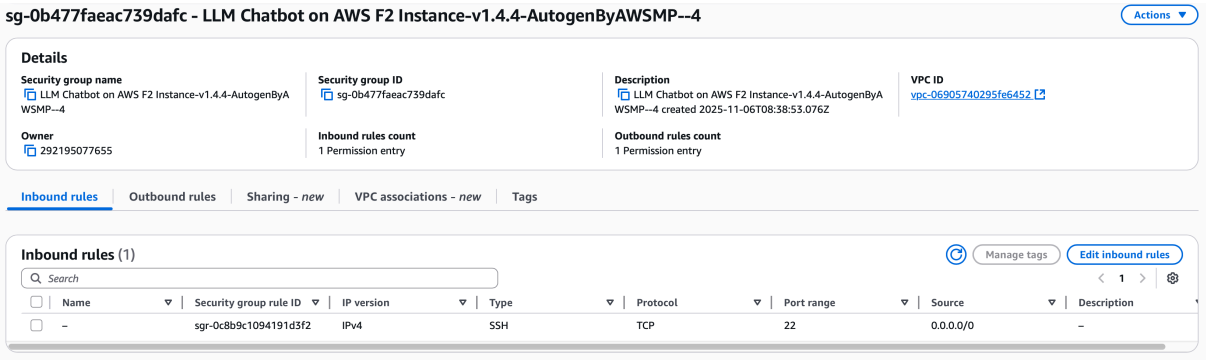
A. vLLM server failure

- If the vLLM server fails to initialize, please re-upload the F2 bitstream and restart the vLLM server.

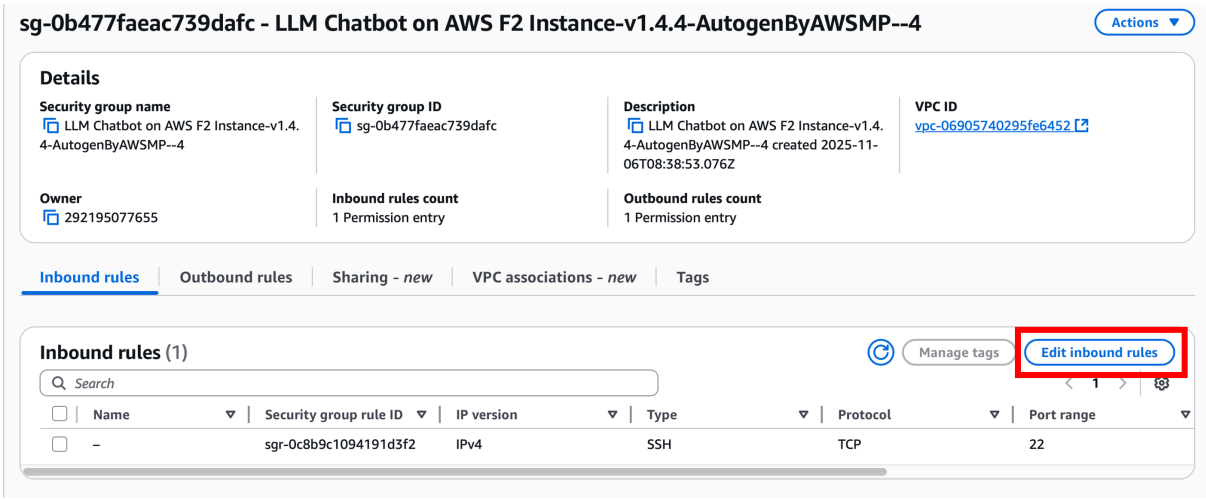
```
>>> load-f2-bitstream                    # Load the FPGA bitstream
>>> vllm serve <huggingface_model_name> --config config/config.yaml
```

- If you don’t have access to the model on Hugging Face, please check whether your account (with the issued token) has been granted permission to access the model. Especially, LLaMA models and HyperCLOVA X models are gated models and require access permissions.

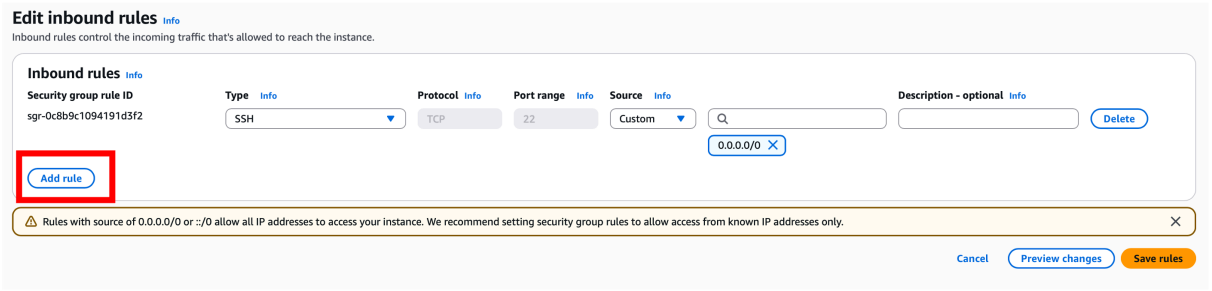
B. Port 5173 is not found



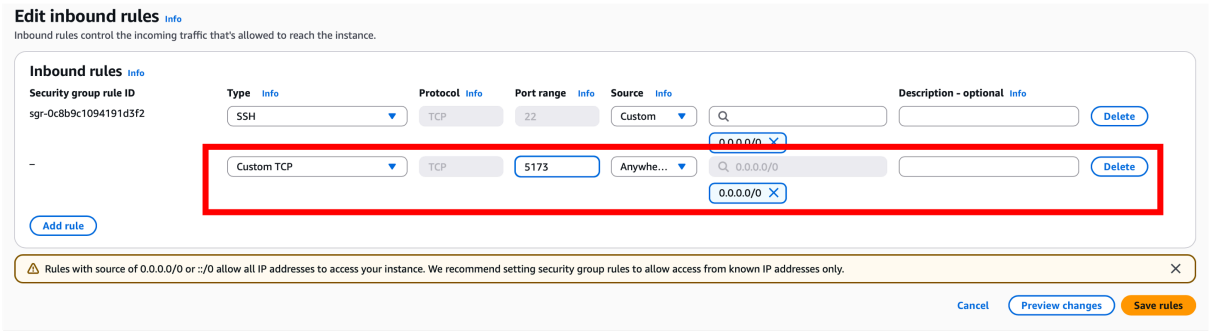
Select Edit inbound rules



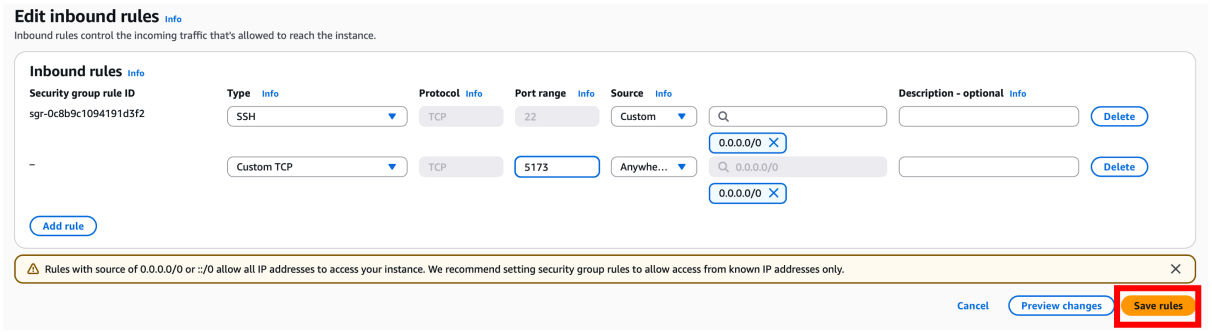
Click Add rule



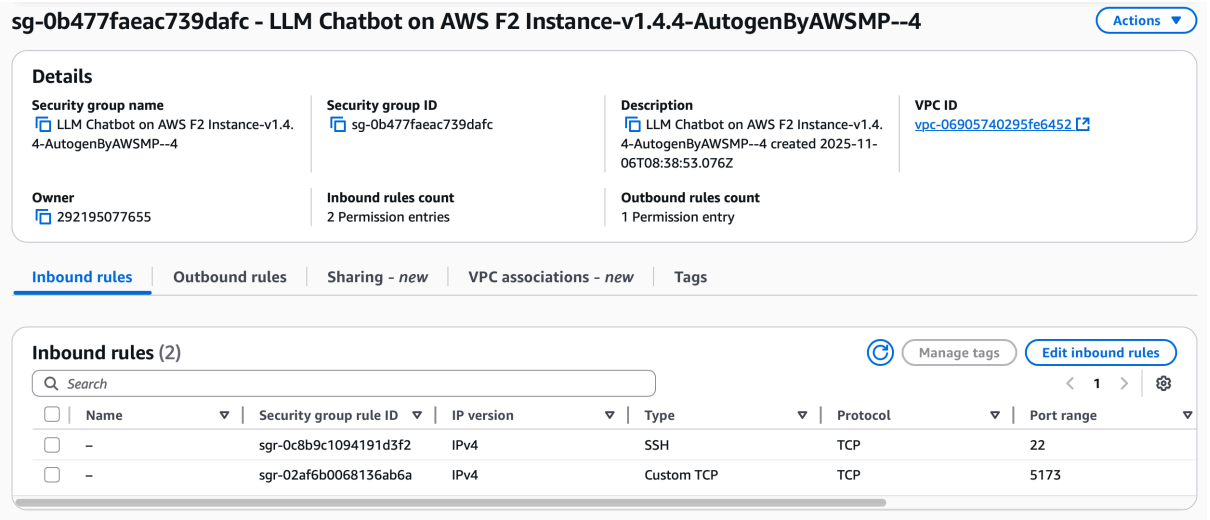
Set Port range as 5173 and source as 0.0.0.0/0



Save rules to save added rule



Now we have opened port 5173



C. MongoDB failure

Our chatbot relies on MongoDB to store chat logs and user data. Although MongoDB should automatically start and connect to the chat-ui, this behavior can vary depending on the environment. If the connection fails, follow the steps below to resolve the issue.

example of MongoDB docker fail log at chat-ui

```
VITE v6.3.5  ready in 1167 ms

➜  Local:   http://localhost:5173/
➜  Network: http://172.31.40.75:5173/
➜  press h + enter to show help
[08:19:19.218] ERROR (8406): Connection error
    err: {
      "type": "MongoServerSelectionError",
      "message": "connect ECONNREFUSED 127.0.0.1:27017",
      "stack":
          MongoServerSelectionError: connect ECONNREFUSED 127.0.0.1:27017
              at Timeout._onTimeout (/home/ubuntu/Projects/HyperDex-Container/hyperaccel-chat-ui/node_modules/mongodb/lib/sdam/topology.js:278:38)
              at listOnTimeout (node:internal/timers:581:17)
              at process.processTimers (node:internal/timers:519:7)
      "reason": {
        "type": "Unknown",
        "servers": {},
        "stale": false,
        "compatible": true,
        "heartbeatFrequencyMS": 10000,
        "localThresholdMS": 15,
        "setName": null,
        "maxElectionId": null,
        "maxSetVersion": null,
        "commonWireVersion": 0,
        "logicalSessionTimeoutMinutes": null
      }
    }
```

Check if MongoDB docker exists

```
$ docker ps
CONTAINER ID   IMAGE          COMMAND      CREATED          STATUS
```

```
PORTS     NAMES
$ docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATU
S         PORTS               NAMES
bdac7cd4a431   mongo:latest   "docker-entrypoint.s..."   3 months ago     E
xited (128) 3 days ago             mongo-chatui
```

Restart the MongoDB Docker container and verify that it is running

```
$ docker restart mongo-chatui
$ docker ps
CONTAINER ID   IMAGE          COMMAND      CREATED        STATUS
PORTS     NAMES
1b62dbfc1d1e   mongo:latest   "docker-entrypoint.s..."   28 minutes ago   Up
28 minutes   0.0.0.0:27017→27017/tcp, [::]:27017→27017/tcp   mongo-chatu
i
```

Once the container is running, please try the Quick Start steps again.