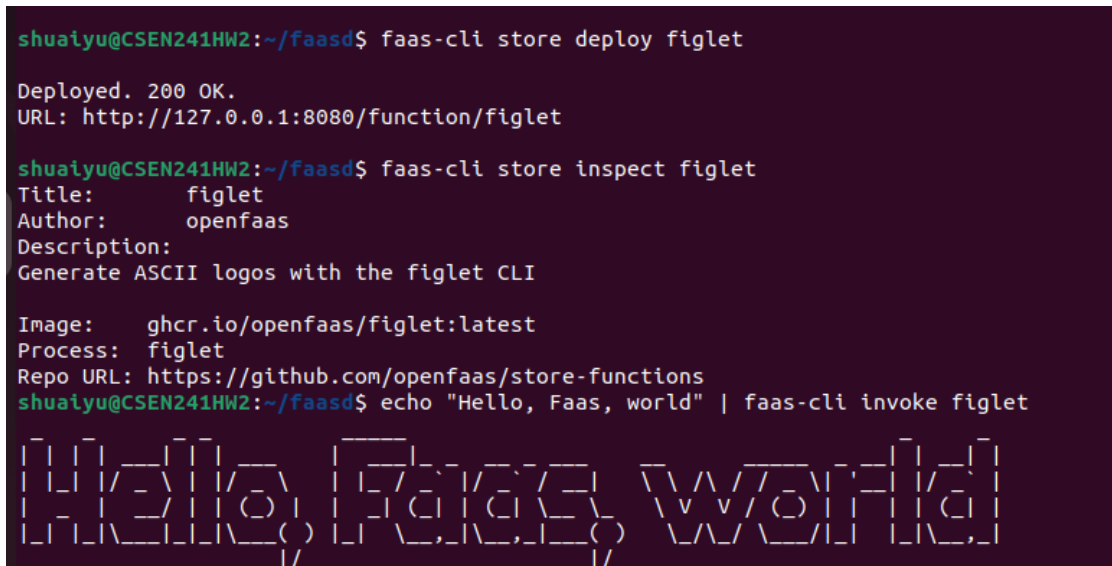CSEN 241 HW 2 Your Own Serverless infrastructure

Student Name: Shuaiyu Wang

Student ID: 00001651250

In this homework, I used VirtualBox on Windows Host OS.

Tasks:

1. A screenshot of invoking the figlet function:

2. Screenshots of running the following command:

sudo journalctl -u faasd --lines 40

Screenshots of OpenFaaS gateway AFTER deploying figlet, slack-handler and slack-interactive functions

Figlet:

```
shuaiyu@CSEN241HW2:~/faasd$ faas-cli store deploy figlet

Deployed. 200 OK.
URL: http://127.0.0.1:8080/function/figlet
```

Slack_request:

```
shuaiyu@CSEN241HW2:~/functions$ faas-cli deploy -f ./slack-request.yml
Deploying: slack-request.

Deployed. 200 OK.
URL: http://127.0.0.1:8080/function/slack-request
```

Slack-interactive:

```
shuaiyu@CSEN241HW2:~/functions$ faas-cli deploy -f ./slack-interactive.yml
Deploying: slack-interactive.

Deployed. 200 OK.
URL: http://127.0.0.1:8080/function/slack-interactive

shuaiyu@CSEN241HW2:~/functions$
```

3. Screenshots of invoking slack-request and slack-interactive functions:

Slack-request:

```
shuaiyu@CSEN241HW2:~/functions$ faas-cli invoke slack-request
Reading from STDIN - hit (Control + D) to stop.
Hi
{"text": "Serverless Message", "attachments": [{"fields": [{"short": true, "valu
e": "100", "title": "Amazing Level"}], "author_icon": "https://avatars.githubuse
rcontent.com/u/31996250", "image_url": "https://avatars.githubusercontent.com/u/
31996250", "author_name": "Shuaiyu Wang", "title": "The Awesome world of Cloud C
omputing! CSEN 241"}, {"text": "CSEN 241 is the most awesome class ever!.", "tit
le": "About CSEN 241"}, {"title": "Would you recommend CSEN 241 to your friends?
", "color": "#3AA3E3", "actions": [{"text": "Of Course!", "type": "button", "nam
e": "recommend", "value": "recommend"}, {"text": "Most Definitely!", "type": "bu
tton", "name": "definitely", "value": "definitely"}], "callback_id": "response12
3", "fallback": "Would you recommend CSEN 241 to your friends?", "attachment_typ
e": "default"}]}
shuaiyu@CSEN241HW2:~/functions$
```

Slack-interactive:

```
shuaiyu@CSEN241HW2:~/functions$ faas-cli invoke slack-interactive
Reading from STDIN - hit (Control + D) to stop.
"Hi"
{"attachments": [{"footer": "Slack Apps built on OpenFaas", "author_link": "http
s://github.com/StormYuchen/CSEN241-HMs", "color": "#36a64f", "text": "Head over
to CSEN 241", "title": "CSEN 241", "ts": 123456789, "author_name": "Shuaiyu Wang
", "title_link": "https://www.scu.edu/engineering/academic-programs/department-o
f-computer-engineering/graduate/course-descriptions/", "image_url": "https://www
.scu.edu/media/offices/umc/scu-brand-guidelines/visual-identity-amp-photography/
visual-identity-toolkit/logos-amp-seals/Mission-Dont3.png", "response_type": "ep
hemeral", "replace_original": true, "footer_icon": "https://a.slack-edge.com/459
01/marketing/img/_rebrand/meta/slack_hash_256.png", "pretext": "Ahh yeah! Great
choice, CSEN 241 is absolutely amazing!", "fallback": "Required plain-text summa
ry of the attachment.", "thumb_url": "https://www.scu.edu/engineering/academic-p
rograms/department-of-computer-engineering/graduate/course-descriptions/", "auth
or_icon": "https://avatars.githubusercontent.com/u/31996250"}]}
```

4. Screenshot of invoking three different cases of the chatbot:

Ask name:

```
shuaiyu@CSEN241HW2:~/functions$ echo '{"question":"What is your name?"}' | faas-cli invoke chatbot
{"text": "I'm known as Chatbot."}
shuaiyu@CSEN241HW2:~/functions$ echo '{"question":"What is your name?"}' | faas-cli invoke chatbot
{"text": "My name is Chatbot."}
shuaiyu@CSEN241HW2:~/functions$ echo '{"question":"What is your name?"}' | faas-cli invoke chatbot
{"text": "You can call me Chatbot."}
shuaiyu@CSEN241HW2:~/functions$
```

Ask time:

```
shuaiyu@CSEN241HW2:~/functions$ echo '{"question":"What is current time?"}' | faas-cli invoke chatbot
{"text": "2024-02-17 02:07:10"}
shuaiyu@CSEN241HW2:~/functions$ echo '{"question":"What is current time?"}' | faas-cli invoke chatbot
{"text": "02:07:15"}
shuaiyu@CSEN241HW2:~/functions$ echo '{"question":"What is current time?"}' | faas-cli invoke chatbot
{"text": "02:07:18"}
shuaiyu@CSEN241HW2:~/functions$ echo '{"question":"What is current time?"}' | faas-cli invoke chatbot
{"text": "02:07:22"}
shuaiyu@CSEN241HW2:~/functions$ echo '{"question":"What is current time?"}' | faas-cli invoke chatbot
{"text": "02:07:26"}
```

Invoking figlet function:

Questions:

1. What is the command to invoke the slack-request function (2 pts)?
a. Via Curl
$ curl http://127.0.0.1:8080/function/slack-request
b. Via faas-cli
faas-cli invoke slack-request

2. What is the output you see when you invoke the slack-request function? (2 pts)
I see JSON responses as returned by the slack-request/handler.py file.

3. What is the command to invoke the slack-interactive function? (2 pts)
a. Via curl
$ curl http://127.0.0.1:8080/function/slack-interactive
b. Via faas-cli
faas-cli invoke slack-interactive

4. What is the output you see when you invoke the slack-interactive function? (2 pts)
I see JSON responses as returned by the slack-interactive/handler.py file.

5. How would you pass different arguments to the functions? (3 pts)
I may try to invoke the functions by pass different arguments:
$ echo <type what you want here> | faas-cli invoke function

6. How would you change the slack-interactive function to react to different inputs? (3 pts)
Parsing JSON data:
The Slack-interactive function can receive JSON data that contains information about the user's interaction. We can parse this data in our code to extract the relevant information, such as the value of a selected option or the text entered into an input field. Based on this information, we can trigger different actions.

7. How long does it take for the chat response to come back? (10pts)
a. For the first request that does not call figlet
About 0.4 seconds.
b. For the second request that does not call figlet
About 0.2 seconds.
c. Average over 10 requests that do not call figlet
About 0.25 seconds.
d. For the first request that calls figlet
About 0.6 seconds.
e. For the second request that calls figlet
About 0.4 seconds.
f. For the second request that calls figlet that follows the first request that does not call figlet
About 0.5 seconds.
g. Average over 10 requests that do call figlet
about 0.46 seconds.

8. Now try sending a series of requests to the chatbot in parallel. At what queries per second does OpenFaaS add a new instance of the function? (6 pts)

```
19T03:01:15Z 2024/02/19 03:01:15 Version: 0.2.3 SHA: b20362a05bde813764e0b20d27de58df2159bc0a
19T03:01:15Z 2024/02/19 03:01:15 Timeouts: read: 30s write: 30s hard: 0s health: 30s.
19T03:01:15Z 2024/02/19 03:01:15 Listening on port: 8080
19T03:01:15Z 2024/02/19 03:01:15 Writing lock-file to: /tmp/.lock
19T03:01:15Z 2024/02/19 03:01:15 Metrics listening on port: 8081
19T03:01:24Z 2024/02/19 03:01:24 Forking fprocess.
19T03:01:25Z 2024/02/19 03:01:25 Wrote 34 Bytes - Duration: 0.381440s
19T03:01:29Z 2024/02/19 03:01:29 Forking fprocess.
19T03:01:29Z 2024/02/19 03:01:29 Wrote 34 Bytes - Duration: 0.262877s
19T03:01:30Z 2024/02/19 03:01:30 Forking fprocess.
19T03:01:31Z 2024/02/19 03:01:31 Wrote 32 Bytes - Duration: 0.222956s
19T03:01:32Z 2024/02/19 03:01:32 Forking fprocess.
19T03:01:32Z 2024/02/19 03:01:32 Wrote 34 Bytes - Duration: 0.207431s
19T03:01:58Z 2024/02/19 03:01:58 Forking fprocess.
19T03:01:59Z 2024/02/19 03:01:59 Wrote 34 Bytes - Duration: 0.218060s
19T03:14:17Z 2024/02/19 03:14:17 Forking fprocess.
19T03:14:17Z 2024/02/19 03:14:17 Wrote 34 Bytes - Duration: 0.205533s
19T03:14:17Z 2024/02/19 03:14:17 Forking fprocess.
19T03:14:18Z 2024/02/19 03:14:18 Wrote 32 Bytes - Duration: 0.204279s
19T03:14:18Z 2024/02/19 03:14:18 Forking fprocess.
19T03:14:18Z 2024/02/19 03:14:18 Wrote 32 Bytes - Duration: 0.206987s
19T03:14:18Z 2024/02/19 03:14:18 Forking fprocess.
19T03:14:18Z 2024/02/19 03:14:18 Wrote 32 Bytes - Duration: 0.239582s
19T03:14:18Z 2024/02/19 03:14:18 Forking fprocess.
19T03:14:18Z 2024/02/19 03:14:18 Wrote 37 Bytes - Duration: 0.218599s
19T03:14:18Z 2024/02/19 03:14:18 Forking fprocess.
19T03:14:19Z 2024/02/19 03:14:19 Wrote 32 Bytes - Duration: 0.240748s
19T03:14:19Z 2024/02/19 03:14:19 Forking fprocess.
19T03:14:19Z 2024/02/19 03:14:19 Wrote 32 Bytes - Duration: 0.211288s
19T03:14:19Z 2024/02/19 03:14:19 Forking fprocess.
19T03:14:19Z 2024/02/19 03:14:19 Wrote 34 Bytes - Duration: 0.227203s
19T03:14:19Z 2024/02/19 03:14:19 Forking fprocess.
19T03:14:20Z 2024/02/19 03:14:20 Wrote 37 Bytes - Duration: 0.201329s
19T03:14:20Z 2024/02/19 03:14:20 Forking fprocess.
19T03:14:20Z 2024/02/19 03:14:20 Wrote 37 Bytes - Duration: 0.199409s
```

According to the log, the average time after calling a function is about 0.3 seconds, so new instances will be added when there are more than four to five concurrent calls per second.

Github link:

https://github.com/StormYuchen/CSEN241-HMs.git