

Coen 241 HW2

Xiao Yang

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My device information



Environment Setup

Since my device is Mac, I used qemu as a VM and choosed Ubuntu 22.04 as linux environment.

```
$ sudo qemu-img create ubuntu.img 10G -f qcow2
```

```
$ sudo qemu-system-x86_64 -m 2046 -hda ubuntu.img
```

Deploy and Setup OpenFaas

Deploy Faas

```
xiao@xiao:~$ curl -sSL http://cli.openfaas.com | sudo sh
Finding latest version from GitHub
0.15.9
Downloading package https://github.com/openfaas/faas-cli/releases/download/0.15.9/faas-cli as /tmp/faas-cli
Download complete.

Running with sufficient permissions to attempt to move faas-cli to /usr/local/bin
New version of faas-cli installed to /usr/local/bin
Creating alias 'faas' for 'faas-cli'.



CLI:
  commit: 45c1d906b77709adde47c35bed868026266389e8
  version: 0.15.9
xiao@xiao:~$
```

Check running status of faasd

```
xiao@xiao:~/faasd$ sudo systemctl status faasd
• faasd.service - faasd
   Loaded: loaded (/lib/systemd/system/faasd.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2023-02-18 04:37:33 UTC; 3min 44s ago
   Main PID: 48293 (faasd)
     Tasks: 7 (limit: 2271)
    Memory: 19.6M (limit: 500.0M)
   CGroup: /system.slice/faasd.service
           └─48293 /usr/local/bin/faasd up

Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "faasd-provider"="10.62.0.1"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Looking up IP for: "prometheus"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 faasd: waiting for SIGTERM or SIGINT
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "nats"="10.62.0.2"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "prometheus"="10.62.0.3"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "basic-auth-plugin"="10.62.0.4"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "gateway"="10.62.0.5"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "queue-worker"="10.62.0.6"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Proxy from: 127.0.0.1:9090, to: prometheus:9090 (10.62.0.3)
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Proxy from: 0.0.0.0:8080, to: gateway:8080 (10.62.0.5)
xiao@xiao:~/faasd$ sudo systemctl status faasd-provider
• faasd-provider.service - faasd-provider
   Loaded: loaded (/lib/systemd/system/faasd-provider.service; enabled; vendor preset: enabled)
   Active: active (running) since Sat 2023-02-18 04:37:33 UTC; 4min 7s ago
   Main PID: 48291 (faasd)
     Tasks: 4 (limit: 2271)
    Memory: 7.2M (limit: 500.0M)
   CGroup: /system.slice/faasd-provider.service
           └─48291 /usr/local/bin/faasd provider

Feb 18 04:37:33 xiao systemd[1]: Started faasd-provider.
Feb 18 04:37:34 xiao faasd[48291]: 2023/02/18 04:37:34 faasd-provider starting..           Service Timeout: 1m0s
Feb 18 04:37:34 xiao faasd[48291]: faasd version: 0.16.8-rc1           commit: 4d6b6dfdc5ccc827742dea4dff506e242b67459b
Feb 18 04:37:34 xiao faasd[48291]: 2023/02/18 04:37:34 Writing network config...
Feb 18 04:37:35 xiao faasd[48291]: 2023/02/18 04:37:35 Listening on TCP port: 8081
xiao@xiao:~/faasd$
```

Assignment Tasks

1. Deploy and Test flglet function


```
provider:
  name: openfaas
  gateway: http://127.0.0.1:8080
functions:
  slack-interactive:
    lang: python
    handler: ./slack-interactive
    image: shawyang98/slack-interactive
    environment:
      content_type: application/json
```

3. Complete slack-request function

handler.py

```

import json

def handle(req):
    data = {
        "text": "Serverless Message",
        "attachments": [{
            "title": "The Awesome world of Cloud Computing! COEN 241",
            "fields": [{
                "title": "Amazing Level",
                "value": "100",
                "short": True
            }],
            "author_name": "Xiao-Yang",
            "author_icon": "",
            "image_url": "https://avatars.githubusercontent.com/FossilDaddy"
        },
        {
            "title": "About COEN 241",
            "text": "COEN 241 is the most awesome class ever!."
        },
        {
            "fallback": "Would you recommend COEN 241 to your friends?",
            "title": "Would you recommend COEN 241 to your friends?",
            "callback_id": "response123",
            "color": "#3AA3E3",
            "attachment_type": "default",
            "actions": [
                {
                    "name": "recommend",
                    "text": "Of Course!",
                    "type": "button",
                    "value": "recommend"
                },
                {
                    "name": "definitely",
                    "text": "Most Definitely!",
                    "type": "button",
                    "value": "definitely"
                }
            ]
        }
    ]
}

return json.dumps(data)

```

slack-request.yml

```
provider:
  name: openfaas
  gateway: http://127.0.0.1:8080
functions:
  slack-request:
    lang: python
    handler: ./slack-request
    image: shawyang98/slack-request
    environment:
      content_type: application/json
```

4. Screenshot of *journalctl* command

```
$ sudo journalctl -u faasd --lines 40
```

```
xiao@xiao:~/functions/slack-request$ sudo journalctl -u faasd --lines 40
[sudo] password for xiao:
-- Logs begin at Sat 2023-02-18 02:55:39 UTC, end at Sat 2023-02-18 08:35:57 UTC. --
Feb 18 04:38:50 xiao faasd[48293]: 2023/02/18 04:38:50 - gateway
Feb 18 04:38:50 xiao faasd[48293]: 2023/02/18 04:38:50 - queue-worker
Feb 18 04:38:50 xiao faasd[48293]: Starting: nats
Feb 18 04:38:50 xiao faasd[48293]: Creating local directory: /var/lib/faasd/nats
Feb 18 04:38:50 xiao faasd[48293]: 2023/02/18 04:38:50 Running nats with user: "65534"
Feb 18 04:38:51 xiao faasd[48293]: 2023/02/18 04:38:51 Created container: nats
Feb 18 04:38:58 xiao faasd[48293]: 2023/02/18 04:38:58 nats has IP: 10.62.0.2
Feb 18 04:38:58 xiao faasd[48293]: 2023/02/18 04:38:58 Task: nats Container: nats
Feb 18 04:38:58 xiao faasd[48293]: Starting: prometheus
Feb 18 04:38:58 xiao faasd[48293]: Creating local directory: /var/lib/faasd/prometheus
Feb 18 04:38:58 xiao faasd[48293]: 2023/02/18 04:38:58 Running prometheus with user: "65534"
Feb 18 04:39:00 xiao faasd[48293]: 2023/02/18 04:39:00 Created container: prometheus
Feb 18 04:39:04 xiao faasd[48293]: 2023/02/18 04:39:04 prometheus has IP: 10.62.0.3
Feb 18 04:39:04 xiao faasd[48293]: 2023/02/18 04:39:04 Task: prometheus Container: prometheus
Feb 18 04:39:04 xiao faasd[48293]: Starting: basic-auth-plugin
Feb 18 04:39:05 xiao faasd[48293]: 2023/02/18 04:39:05 Created container: basic-auth-plugin
Feb 18 04:39:10 xiao faasd[48293]: 2023/02/18 04:39:10 basic-auth-plugin has IP: 10.62.0.4
Feb 18 04:39:10 xiao faasd[48293]: 2023/02/18 04:39:10 Task: basic-auth-plugin Container: basic-auth-plugin
Feb 18 04:39:10 xiao faasd[48293]: Starting: gateway
Feb 18 04:39:11 xiao faasd[48293]: 2023/02/18 04:39:11 Created container: gateway
Feb 18 04:39:15 xiao faasd[48293]: 2023/02/18 04:39:15 gateway has IP: 10.62.0.5
Feb 18 04:39:15 xiao faasd[48293]: 2023/02/18 04:39:15 Task: gateway Container: gateway
Feb 18 04:39:15 xiao faasd[48293]: Starting: queue-worker
Feb 18 04:39:16 xiao faasd[48293]: 2023/02/18 04:39:16 Created container: queue-worker
Feb 18 04:39:19 xiao faasd[48293]: 2023/02/18 04:39:19 queue-worker has IP: 10.62.0.6
Feb 18 04:39:19 xiao faasd[48293]: 2023/02/18 04:39:19 Task: queue-worker Container: queue-worker
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Supervisor init done in: About a minute
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Looking up IP for: "gateway"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver rebuilding map
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "localhost"="127.0.0.1"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "faasd-provider"="10.62.0.1"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Looking up IP for: "prometheus"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 faasd: waiting for SIGTERM or SIGINT
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "nats"="10.62.0.2"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "prometheus"="10.62.0.3"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "basic-auth-plugin"="10.62.0.4"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "gateway"="10.62.0.5"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Resolver: "queue-worker"="10.62.0.6"
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Proxy from: 127.0.0.1:9090, to: prometheus:9090 (10.62.0.3)
Feb 18 04:39:20 xiao faasd[48293]: 2023/02/18 04:39:20 Proxy from: 0.0.0.0:8080, to: gateway:8080 (10.62.0.5)
xiao@xiao:~/functions/slack-request$
```

5. Deploy figlet/ slack-interactive/ slack-request functions

List all deployed functions

```
xiao@xiao:~$ faas-cli list
Function                               Invocations    Replicas
figlet                                1              1
slack-interactive                      0              1
slack-request                         0              1
xiao@xiao:~$
```

Deployed slack-interactive

```
xiao@xiao:~/functions$ faas-cli deploy -f ./slack-interactive.yml
Deploying: slack-interactive.
Function slack-interactive already exists, attempting rolling-update.

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

xiao@xiao:~/functions$ _
```

Deployed slack-request

```
xiao@xiao:~/functions$ faas-cli deploy -f ./slack-request.yml
Deploying: slack-request.
Function slack-request already exists, attempting rolling-update.

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

xiao@xiao:~/functions$
```

6. Invoke slack-interactive and slack-request

Invoke slack-interactive function

```
xiao@xiao:~/functions$ curl localhost:8080/function/slack-interactive -d '{"Hi":"Xiao"}'
{"attachments": [{"footer": "Slack Apps built on OpenFaas", "author_link": "https://github.com/FossilDaddy/Coen-241", "color": "#36a64f", "text": "Head over to COEN 241", "title": "COEN 241", "ts": 123456789, "author_name": "", "title_link": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/", "image_url": "https://www.scu.edu/media/offices/umc/scu-brand-guidelines/visual-identity-and-photography/visual-identity-toolkit/logos-and-seals/Mission-Dont3.png", "response_type": "ephemeral", "replace_original": true, "footer_icon": "https://a.slack-edge.com/45901/marketing/img/_rebrand/meta/slack_hash_256.png", "pretext": "Ahh yeah! Great choice, COEN 241 is absolutely amazing!", "fallback": "Required plain-text summary of the attachment.", "thumb_url": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/", "author_icon": "https://avatars.githubusercontent.com/FossilDaddy"}]}
xiao@xiao:~/functions$ echo '{"Hi":"Xiao"}' | faas-cli invoke slack-interactive
{"attachments": [{"footer": "Slack Apps built on OpenFaas", "author_link": "https://github.com/FossilDaddy/Coen-241", "color": "#36a64f", "text": "Head over to COEN 241", "title": "COEN 241", "ts": 123456789, "author_name": "", "title_link": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/", "image_url": "https://www.scu.edu/media/offices/umc/scu-brand-guidelines/visual-identity-and-photography/visual-identity-toolkit/logos-and-seals/Mission-Dont3.png", "response_type": "ephemeral", "replace_original": true, "footer_icon": "https://a.slack-edge.com/45901/marketing/img/_rebrand/meta/slack_hash_256.png", "pretext": "Ahh yeah! Great choice, COEN 241 is absolutely amazing!", "fallback": "Required plain-text summary of the attachment.", "thumb_url": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/", "author_icon": "https://avatars.githubusercontent.com/FossilDaddy"}]}
xiao@xiao:~/functions$
```

Invoke slack-request function

```
xiao@xiao:~/functions$ curl localhost:8080/function/slack-request
{"text": "Serverless Message", "attachments": [{"fields": [{"short": true, "value": "100", "title": "Amazing Level"}], "author_icon": "", "image_url": "https://avatars.githubusercontent.com/FossilDaddy", "author_name": "Xiao-Yang", "title": "The Awesome world of Cloud Computing! COEN 241", "text": "COEN 241 is the most awesome class ever!", "title": "About COEN 241", "title": "Would you recommend COEN 241 to your friends?", "color": "#3AA3E3", "actions": [{"text": "Of Course!", "type": "button", "name": "recommend", "value": "recommend"}, {"text": "Most Definitely!", "type": "button", "name": "definitely", "value": "definitely"}], "callback_id": "response123", "fallback": "Would you recommend COEN 241 to your friends?", "attachment_type": "default"}]}
xiao@xiao:~/functions$ echo '{"Hi":"Xiao"}' | faas-cli invoke slack-request
{"text": "Serverless Message", "attachments": [{"fields": [{"short": true, "value": "100", "title": "Amazing Level"}], "author_icon": "", "image_url": "https://avatars.githubusercontent.com/FossilDaddy", "author_name": "Xiao-Yang", "title": "The Awesome world of Cloud Computing! COEN 241", "text": "COEN 241 is the most awesome class ever!", "title": "About COEN 241", "title": "Would you recommend COEN 241 to your friends?", "color": "#3AA3E3", "actions": [{"text": "Of Course!", "type": "button", "name": "recommend", "value": "recommend"}, {"text": "Most Definitely!", "type": "button", "name": "definitely", "value": "definitely"}], "callback_id": "response123", "fallback": "Would you recommend COEN 241 to your friends?", "attachment_type": "default"}]}
xiao@xiao:~/functions$ _
```


Assignment Questions

1. Command for invoking slack-interactive function

a. Via Curl

```
$ curl localhost:8080/function/slack-interactive
```

```
$ curl 127.0.0.1:8080/function/slack-interactive
```

b. Via faas-cli

```
$ echo "" | faas-cli invoke slack-interactive
```

2. Output for invoking slack-interactive function

```
xiao@xiao:~/functions$ curl localhost:8080/function/slack-interactive -d '{"Hi":"Xiao"}'
{"attachments": [{"footer": "Slack Apps built on OpenFaas", "author_link": "https://github.com/FossilDaddy/Coen-241", "color": "#36a64f", "text": "Head over to COEN 241", "title": "COEN 241", "ts": 123456789, "author_name": "", "title_link": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/", "image_url": "https://www.scu.edu/media/offices/umc/scu-brand-guidelines/visual-identity-and-photography/visual-identity-toolkit/logos-and-seals/Mission-Dont3.png", "response_type": "ephemeral", "replace_original": true, "footer_icon": "https://a.slack-edge.com/45901/marketing/img/_rebrand/meta/slack_hash_256.png", "pretext": "Ahh yeah! Great choice, COEN 241 is absolutely amazing!", "fallback": "Required plain-text summary of the attachment.", "thumb_url": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/", "author_icon": "https://avatars.githubusercontent.com/FossilDaddy"}]}
xiao@xiao:~/functions$ echo '{"Hi":"Xiao"}' | faas-cli invoke slack-interactive
{"attachments": [{"footer": "Slack Apps built on OpenFaas", "author_link": "https://github.com/FossilDaddy/Coen-241", "color": "#36a64f", "text": "Head over to COEN 241", "title": "COEN 241", "ts": 123456789, "author_name": "", "title_link": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/", "image_url": "https://www.scu.edu/media/offices/umc/scu-brand-guidelines/visual-identity-and-photography/visual-identity-toolkit/logos-and-seals/Mission-Dont3.png", "response_type": "ephemeral", "replace_original": true, "footer_icon": "https://a.slack-edge.com/45901/marketing/img/_rebrand/meta/slack_hash_256.png", "pretext": "Ahh yeah! Great choice, COEN 241 is absolutely amazing!", "fallback": "Required plain-text summary of the attachment.", "thumb_url": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/", "author_icon": "https://avatars.githubusercontent.com/FossilDaddy"}]}
xiao@xiao:~/functions$
```

3. Command for invoking slack-request function

a. Via Curl

```
$ curl localhost:8080/function/slack-request
```

```
$ curl 127.0.0.1:8080/function/slack-request
```

b. Via faas-cli

```
$ echo "" | faas-cli invoke slack-request
```

4. Output for invoking slack-request function

```
xiao@xiao:~/functions$ curl localhost:8080/function/slack-request
{"text": "Serverless Message", "attachments": [{"fields": [{"short": true, "value": "100", "title": "Amazing Level"}], "author_icon": "", "image_url": "https://avatars.githubusercontent.com/FossilDaddy", "author_name": "Xiao-Yang", "title": "The Awesome world of Cloud Computing! COEN 241", {"text": "COEN 241 is the most awesome class ever!.", "title": "About COEN 241"}, {"text": "Would you recommend COEN 241 to your friends?", "color": "#3AA3E3", "actions": [{"text": "Of Course!", "type": "button", "name": "recommend", "value": "recommend"}, {"text": "Most Definitely!", "type": "button", "name": "definitely", "value": "definitely"}], "callback_id": "response123", "fallback": "Would you recommend COEN 241 to your friends?", "attachment_type": "default"}]}
xiao@xiao:~/functions$ echo "Hi Xiao" | faas-cli invoke slack-request
{"text": "Serverless Message", "attachments": [{"fields": [{"short": true, "value": "100", "title": "Amazing Level"}], "author_icon": "", "image_url": "https://avatars.githubusercontent.com/FossilDaddy", "author_name": "Xiao-Yang", "title": "The Awesome world of Cloud Computing! COEN 241", {"text": "COEN 241 is the most awesome class ever!.", "title": "About COEN 241"}, {"text": "Would you recommend COEN 241 to your friends?", "color": "#3AA3E3", "actions": [{"text": "Of Course!", "type": "button", "name": "recommend", "value": "recommend"}, {"text": "Most Definitely!", "type": "button", "name": "definitely", "value": "definitely"}], "callback_id": "response123", "fallback": "Would you recommend COEN 241 to your friends?", "attachment_type": "default"}]}
xiao@xiao:~/functions$ _
```

5. How to pass argument for function

a. STDIN by using ‘-d’ for curl

```
$ curl localhost:8080/function/slack-interactive -d '{"Hi", "Xiao"}'
```

b. Using “echo” command for faas-cli

```
$ echo '{"Hi", "Xiao"}' | faas-cli invoke slack-interactive
```

6. How to change slack-interactive function to react different inputs

The *handle(req)* function should take “req” as input argument and parse it accordingly for creating “data”, some attributes in “data” can be returned different value based on specific “req”.