

Santa Clara University

COEN 241: Cloud Computing

HW 2 - Your Own Serverless Infrastructure-2

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Screenshot of invoking the figlet function:

```
sudo faas-cli store deploy figlet
```

```
akumar14@akumar14:~/functions$ sudo faas-cli store deploy figlet
Function figlet already exists, attempting rolling-update.

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

```
sudo echo "Hello, FaaS, world" | faas-cli invoke figlet
```

```
[akumar14@akumar14:~/functions$ sudo echo "Hello, FaaS, world" | faas-cli invoke figlet
[ _   _ ] / _ \ [ _   _ ] / _ \
[ _ - | | _ / | ( ) | [ _ - | ( ) | ( | | _ ) | \ _ ( ) |
[ _ | | | \ _ | | \ _ ( ) | / | /
akumar14@akumar14:~/functions$
```

Complete slack-interactive/handler.py:

```
import requests
import json
import urllib

def handle(req):
    urlstring = urllib.unquote(req).decode('utf8').strip('payload=')
    response = json.loads(urlstring)
    a = response.keys()
    for key in a:
        new = key
    data = {
        "attachments": [
            {
                "key": response[key],
                "replace_original": True,
                "response_type": "ephemeral",
                "fallback": "Required plain-text summary of the attachment.",
                "color": "#36a64f",
                "pretext": "Ahh yeah! Great choice, COEN 241 is absolutely amazing!",
                "author_name": "Ankita Kumar",
                "author_link": "https://github.com/KumarAnkita/COEN-HW2.git",
                "author_icon": "https://github.com/KumarAnkita/KumarAnkita.git",
                "title": "COEN 241",
                "title_link": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/courses-descriptions/",
                "text": "Head over to COEN 241",
                "image_url": "https://www.scu.edu/media/offices/umc/scu-brand-guidelines/visual-identity-and-photography/visual-id-entity-toolkit/logos-and-seals/Mission-Dont3.png",
                "thumb_url": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/",
                "footer": "Slack Apps built on OpenFaas",
                "footer_icon": "https://a.slack-edge.com/45901/marketing/img/_rebrand/meta/slack_hash_256.png",
                "ts": 123456789
            }
        ]
    }
    return json.dumps(data)
```

Build slack-interactive:

```
sudo faas-cli build -f ./slack-interactive.yml
```

```
Successfully built b2468a73fd31
Successfully tagged ankitakumar14/slack-interactive:latest
Image: ankitakumar14/slack-interactive:latest built.
[0] < Building slack-interactive done in 10.89s.
[0] Worker done.

Total build time: 10.89s
```

Push slack-interactive:

```
sudo faas-cli push -f ./slack-interactive.yml
```

```

akumar14@akumar14:~/functions$ sudo faas-cli push -f ./slack-interactive.yml
[0] > Pushing slack-interactive [ankitakumar14/slack-interactive:latest].
The push refers to repository [docker.io/ankitakumar14/slack-interactive]
cd6642d03d31: Pushed
6f7f3b40b6fc: Pushed
fb4b7dbc0ce0: Layer already exists
e7bcef5cd7b7: Layer already exists
9cce692b7721: Layer already exists
559e609ad46f: Layer already exists
fef6173e41b2: Layer already exists
77df73eb0eb3: Layer already exists
9e1d76bece41: Layer already exists
be6ba55f6ee0: Layer already exists
30ff10cca60c: Layer already exists
1c036396e762: Layer already exists
0660508b4ac7: Layer already exists
879c0d8666e3: Layer already exists
20a7b70bdf2f: Layer already exists
3fc750b41be7: Layer already exists
beee9f30bc1f: Layer already exists
latest: digest: sha256:80da53b64d7647c73f2dda249abb0f4b4bc5505b1df97d041cc9a82f11dda23f size: 4074
[0] < Pushing slack-interactive [ankitakumar14/slack-interactive:latest] done.
[0] Worker done

```

Deploy slack-interactive:

```

sudo faas-cli deploy -f ./slack-interactive.yml --gateway
http://127.0.0.1:8080

```

```

akumar14@akumar14:~/functions$ sudo faas-cli deploy -f ./slack-interactive.yml --gateway http://127.0.0.1:8080
Deploying: slack-interactive.
Function slack-interactive already exists, attempting rolling-update.

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

```

Invoke slack-interactive using curl:

```

curl http://127.0.0.1:8080/function/slack-interactive -d '{"Hello": "COEN 241"}'

```

```

akumar14@akumar14:~/functions$ curl http://127.0.0.1:8080/function/slack-interactive -d '{"Hello": "COEN 241"}'
{"attachments": [{"footer": "Slack Apps built on OpenFaas", "author_link": "https://github.com/KumarAnkita/COEN-HW2.git", "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-amp-photography/visual-identity-toolkit/logos-amp-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://github.com/KumarAnkita/KumarAnkita.git"}]}

```

Complete slack-request/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": " Ankita Kumar",
                "author_icon": "",
                "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"
            },
            {
                "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)
```

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Build & Push Slack-request:

```
---> 9ea09b69795f
Successfully built 9ea09b69795f
Successfully tagged ankitakumar14/slack-request:latest
Image: ankitakumar14/slack-request:latest built.
[0] < Building slack-request done in 10.73s.
[0] Worker done.

Total build time: 10.73s
akumar14@akumar14:~/functions$ sudo faas-cli push -f ./slack-request.yml
[0] > Pushing slack-request [ankitakumar14/slack-request:latest].
The push refers to repository [docker.io/ankitakumar14/slack-request]
bc1aa80b19ce: Pushed
0692679cd1f8: Pushed
fb4b7dbc0ce0: Mounted from ankitakumar14/hello-python
e7bcef5cd7b7: Mounted from ankitakumar14/hello-python
9cce692b7721: Mounted from ankitakumar14/hello-python
559e609ad46f: Mounted from ankitakumar14/hello-python
fef6173e41b2: Mounted from ankitakumar14/hello-python
77df73eb0eb3: Mounted from ankitakumar14/hello-python
9e1d76bece41: Mounted from ankitakumar14/hello-python
be6ba55f6ee0: Mounted from ankitakumar14/hello-python
30ff10cca60c: Mounted from ankitakumar14/hello-python
1c036396e762: Mounted from ankitakumar14/hello-python
0660508b4ac7: Mounted from ankitakumar14/hello-python
879c0d8666e3: Mounted from ankitakumar14/hello-python
20a7b70bdf2f: Mounted from ankitakumar14/hello-python
3fc750b41be7: Mounted from ankitakumar14/hello-python
beee9f30bc1f: Mounted from ankitakumar14/hello-python
latest: digest: sha256:028f3b2daf839f85007fe92a7409b2db168ccf3859447b9d203102935372f1cb size: 4074
[0] < Pushing slack-request [ankitakumar14/slack-request:latest] done.
[0] Worker done.
```

Deploy slack-request:

```
sudo faas-cli deploy -f ./slack-request.yml --gateway
http://127.0.0.1:8080
```

```
akumar14@akumar14:~/functions$ sudo faas-cli deploy -f ./slack-request.yml --gateway http://127.0.0.1:8080
Deploying: slack-request.
Function slack-request already exists, attempting rolling-update.

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

Screenshot of running the following command:

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

```
akumar14@akumar14:~/functions$ sudo journalctl -u faasd --lines 40
[sudo] password for akumar14:
-- Logs begin at Mon 2021-11-08 02:47:54 UTC, end at Mon 2021-11-08 21:18:12 UTC. --
Nov 08 20:09:35 akumar14 faasd[683]: 2021/11/08 20:09:35 Start-up order:
Nov 08 20:09:35 akumar14 faasd[683]: 2021/11/08 20:09:35 - nats
Nov 08 20:09:35 akumar14 faasd[683]: 2021/11/08 20:09:35 - queue-worker
Nov 08 20:09:35 akumar14 faasd[683]: 2021/11/08 20:09:35 - basic-auth-plugin
Nov 08 20:09:35 akumar14 faasd[683]: 2021/11/08 20:09:35 - prometheus
Nov 08 20:09:35 akumar14 faasd[683]: 2021/11/08 20:09:35 - gateway
Nov 08 20:09:35 akumar14 faasd[683]: Starting: nats
Nov 08 20:09:36 akumar14 faasd[683]: 2021/11/08 20:09:36 Created container: nats
Nov 08 20:38:24 akumar14 faasd[683]: 2021/11/08 20:38:24 nats has IP: 10.62.0.2
Nov 08 20:38:24 akumar14 faasd[683]: 2021/11/08 20:38:24 Task: nats           Container: nats
Nov 08 20:38:25 akumar14 faasd[683]: Starting: queue-worker
Nov 08 20:38:25 akumar14 faasd[683]: 2021/11/08 20:38:25 Created container: queue-worker
Nov 08 20:38:28 akumar14 faasd[683]: 2021/11/08 20:38:28 queue-worker has IP: 10.62.0.3
Nov 08 20:38:28 akumar14 faasd[683]: 2021/11/08 20:38:28 Task: queue-worker      Container: queue-worker
Nov 08 20:38:28 akumar14 faasd[683]: Starting: basic-auth-plugin
Nov 08 20:38:28 akumar14 faasd[683]: 2021/11/08 20:38:28 Created container: basic-auth-plugin
Nov 08 20:38:30 akumar14 faasd[683]: 2021/11/08 20:38:30 basic-auth-plugin has IP: 10.62.0.4
Nov 08 20:38:31 akumar14 faasd[683]: 2021/11/08 20:38:31 Task: basic-auth-plugin      Container: basic-auth-plugin
Nov 08 20:38:31 akumar14 faasd[683]: Starting: prometheus
Nov 08 20:38:31 akumar14 faasd[683]: 2021/11/08 20:38:31 Created container: prometheus
Nov 08 20:38:33 akumar14 faasd[683]: 2021/11/08 20:38:33 prometheus has IP: 10.62.0.5
Nov 08 20:38:33 akumar14 faasd[683]: 2021/11/08 20:38:33 Task: prometheus        Container: prometheus
Nov 08 20:38:33 akumar14 faasd[683]: Starting: gateway
Nov 08 20:38:34 akumar14 faasd[683]: 2021/11/08 20:38:34 Created container: gateway
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 gateway has IP: 10.62.0.6
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Task: gateway       Container: gateway
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Supervisor init done in: 19.019298s
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Looking up IP for: "gateway"
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Resolver rebuilding map
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Resolver: "localhost"="127.0.0.1"
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Resolver: "faasd-provider"="10.62.0.1"
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Resolver: "nats"="10.62.0.2"
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Resolver: "queue-worker"="10.62.0.3"
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Resolver: "basic-auth-plugin"="10.62.0.4"
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Resolver: "prometheus"="10.62.0.5"
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Resolver: "gateway"="10.62.0.6"
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Looking up IP for: "prometheus"
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Proxy from: 127.0.0.1:9090, to: prometheus:9090 (10.62.0.5)
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 faasd: waiting for SIGTERM or SIGINT
Nov 08 20:38:37 akumar14 faasd[683]: 2021/11/08 20:38:37 Proxy from: 0.0.0.0:8080, to: gateway:8080 (10.62.0.6)
akumar14@akumar14:~/functions$
```

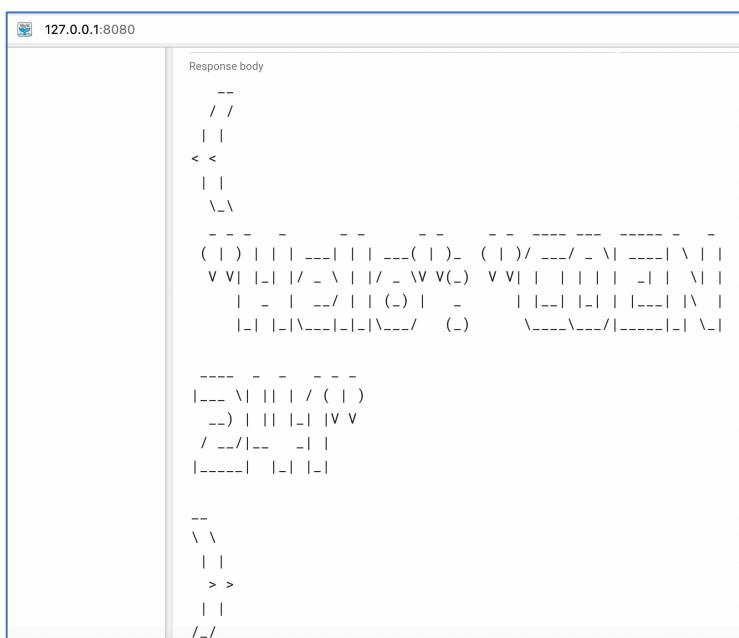
Provide a screenshot of your OpenFaaS gateway AFTER deploying figlet, slack-handler and slack-interactive functions (10 pts)

After Deploying Figlet:

The screenshot shows the OpenFaaS gateway interface at <http://127.0.0.1:8080>. On the left sidebar, there are links for 'Deploy New Function', 'Search for Function', 'hello-python', 'figlet', 'slack-request', and 'slack-interactive'. The main panel displays the 'figlet' function details: Status is 'Ready', Replicas is '1', Invocation count is '3', Image is 'ghcr.io/openfaas/figlet:latest', and URL is '<http://127.0.0.1:8080/function/figlet>'. Below this, there is an 'Invoke function' section with an 'INVOKE' button, radio buttons for 'Text' (selected), 'JSON', and 'Download', and a request body input field containing the following JSON:

```
{ "Hello": "COEN 241" }
```

Below the invoke section, the response status is '200' and the round-trip time is '0.208'. The response body is shown as a large block of ASCII art representing the word 'COEN 241' in a stylized font.



After Deploying Slack-interactive:

The screenshot shows the OpenFaaS UI at 127.0.0.1:8080. On the left sidebar, there are several functions listed: hello-python, figlet, slack-interactive (which is selected), and slack-request. The main panel displays the details for the slack-interactive function. It shows the status as Ready, 1 replica, and an invocation count of 2. The image is set to docker.io/ankitakumar14/slack-interactive:latest, and the function process is python index.py. The URL for the function is http://127.0.0.1:8080/function/slack-interactive. Below this, the 'Invoke function' section allows for selecting Text, JSON, or Download, with JSON being selected. The request body is a JSON object with "Hello": "COEN 241". The response status is 200, and the round-trip time is 1.22 seconds. The response body is empty.

The screenshot shows the detailed response body from the slack-interactive function. The response body is a large JSON object containing various fields related to a Slack message attachment. Key fields include:

- attachments: An array containing one element.
- footer: "Slack Apps built on OpenFaas"
- author_link: "https://github.com/KumarAnkita/COEN-HW2.git"
- 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://github.com/KumarAnkita/KumarAnkita.git"

After Deploying Slack-Request

The screenshot shows the OpenFaaS UI at 127.0.0.1:8080. On the left sidebar, there are several functions listed: hello-python, figlet, slack-request (which is highlighted in blue), and slack-interactive. The main panel displays the details for the 'slack-request' function. It shows the status as 'Ready', 1 replica, and an invocation count of 3. The image field is set to dockr.io/ankitakumar14/slack-request:latest, and the URL is <http://127.0.0.1:8080/function/slack-request>. The function process is defined as 'python index.py'. Below this, the 'Invoke function' section contains an 'INVOKE' button, radio buttons for 'Text' (selected), 'JSON' (unchecked), and 'Download' (unchecked), and a request body editor with the following JSON:

```
{ "Hello": "COEN 241" }
```

Under the invoke section, the response status is 200 and the round-trip time is 0.762 seconds. The response body is shown in a large text area:

```
{ "text": "Serverless Message", "attachments": [ { "fields": [ { "short": true, "value": "100", "title": "Amazing Level" } ], "author_icon": "", "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", "author_name": "Ankita Kumar", "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", "url": "https://www.scu.edu/media/offices/umc/scu-brand-guidelines/visual-identity-and-photography/visual-identity-toolkit/logos-and-seals/Mission-Dont3.png" } ] } ] }
```

```
{ "text": "Serverless Message", "attachments": [ { "fields": [ { "short": true, "value": "100", "title": "Amazing Level" } ], "author_icon": "", "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", "author_name": "Ankita Kumar", "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", "url": "https://www.scu.edu/media/offices/umc/scu-brand-guidelines/visual-identity-and-photography/visual-identity-toolkit/logos-and-seals/Mission-Dont3.png" } ] } ] }
```

Provide a screenshot of invoking slack-request and slack-interactive functions (10 pts)

```
curl http://127.0.0.1:8080/function/slack-request -d '{"Hello": "COEN 241"}'
```

```
akumar14@akumar14:~/functions$ curl http://127.0.0.1:8080/function/slack-request -d '{"Hello": "COEN 241"}'  
{"text": "Serverless Message", "attachments": [{"fields": [{"short": true, "value": "100", "title": "Amazing Level"}], "author_icon": "", "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", "author_name": " Ankita Kumar", "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"}]}
```

```
curl http://127.0.0.1:8080/function/slack-interactive -d '{"Hello": "COEN 241"}'
```

```
akumar14@akumar14:~/functions$ curl http://127.0.0.1:8080/function/slack-interactive -d '{"Hello": "COEN 241"}'  
{"attachments": [{"footer": "Slack Apps built on OpenFaas", "author_link": "https://github.com/KumarAnkita/COEN-HW2.git", "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-amp-photography/visual-identity-toolkit/logos-amp-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://github.com/KumarAnkita/KumarAnkita.git"}]}
```

STEP 6 Questions:

1. The command to invoke the slack-request function

a. Via Curl:

```
curl http://127.0.0.1:8080/function/slack-request -d  
'{"Hello": "COEN 241"}'
```

b. Via faas-cli:

```
sudo echo "hello" | faas-cli invoke slack-request
```

2. The output you when we invoke the slack-request function:

We see the entire Json “data attachment” which is hard-coded through the slack-request – handler.py function, gets printed on the screen as it is.

```
akumar14@akumar14:~/functions$ curl http://127.0.0.1:8080/function/slack-request -d '{"Hello": "COEN 241"}'  
{"text": "Serverless Message", "attachments": [{"fields": [{"short": true, "value": "100", "title": "Amazing Level"}], "author_icon": "", "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", "author_name": " Ankita Kumar", "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"}]}
```

3. The command to invoke the slack-interactive function

a. Via Curl:

```
curl http://127.0.0.1:8080/function/slack-interactive -d  
'{"Hello": "COEN 241"}'
```

b. Via faas-cli:

```
sudo echo '{"Hello": "Hello I am learning"}' | faas-cli invoke  
slack-interactive
```

4. The output you see when you invoke the slack-interactive function

We see the entire Json “data attachment” which is hard-coded through the slack-interactive– handler.py function, gets printed on the screen as it is.

```
akumar14@akumar14:~/functions$ curl http://127.0.0.1:8080/function/slack-interactive -d '{"Hello": "COEN 241"}'  
{"attachments": [{"footer": "Slack Apps built on OpenFaas", "author_link": "https://github.com/KumarAnkita/COEN-HW2.git", "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-amp-photography/visual-identity-toolkit/logos-amp-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://github.com/KumarAnkita/KumarAnkita.git"}]}
```

5. How would you pass different arguments to the functions?

- a. With the -d flag i.e. -d "my data here"
- b. With --data-binary @filename.txt to send a whole file including newlines
- c. To pass input from STDIN then we can use --data-binary @-

example:

```
curl http://127.0.0.1:8080/function/slack-interactive -d '{"Hello":  
"COEN 241"}'
```

6. How would you change the slack-interactive function to react to different inputs?

I have done some changes in the Slack-interactive handler.py to accept different inputs using response.keys() and added the same to the Json data dump.

```
import requests  
import json  
import urllib  
  
def handle(req):  
    urlstring = urllib.unquote(req).decode('utf8').strip('payload=')  
    response = json.loads(urlstring)  
    a = response.keys()  
    for key in a:  
        new = key  
    data = {  
        "attachments": [  
            {  
                "ky": response[key],
```

The updated slack-interactive/handler.py program is below, which accepts input and updates the output based on the dynamic input received while invoking the function.

```

import requests
import json
import urllib

def handle(req):
    urlstring = urllib.unquote(req).decode('utf8').strip('payload=')
    response = json.loads(urlstring)
    a = response.keys()
    for key in a:
        new = key
    data = {
        "attachments": [
            {
                "ky": response[key],
                "replace_original": True,
                "response_type": "ephemeral",
                "fallback": "Required plain-text summary of the attachment.",
                "color": "#36a64f",
                "pretext": "Ahh yeah! Great choice, COEN 241 is absolutely amazing!",
                "author_name": "",
                "author_link": "https://github.com/KumarAnkita/COEN-HW2.git",
                "author_icon": "https://github.com/KumarAnkita/KumarAnkita.git",
                "title": "COEN 241",
                "title_link": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/",
                "text": "Head over to COEN 241",
                "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",
                "thumb_url": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/",
                "footer": "Slack Apps built on OpenFaas",
                "footer_icon": "https://a.slack-edge.com/45901/marketing/img/_rebrand/meta/slack_hash_256.png",
                "ts": 123456789
            }
        ]
    }
    return json.dumps(data)

```

Output of Slack-interactive with dynamic input:

```

sudo curl http://127.0.0.1:8080/function/slack-interactive -d
'{"Hello": "Hello I am learning"}'

```

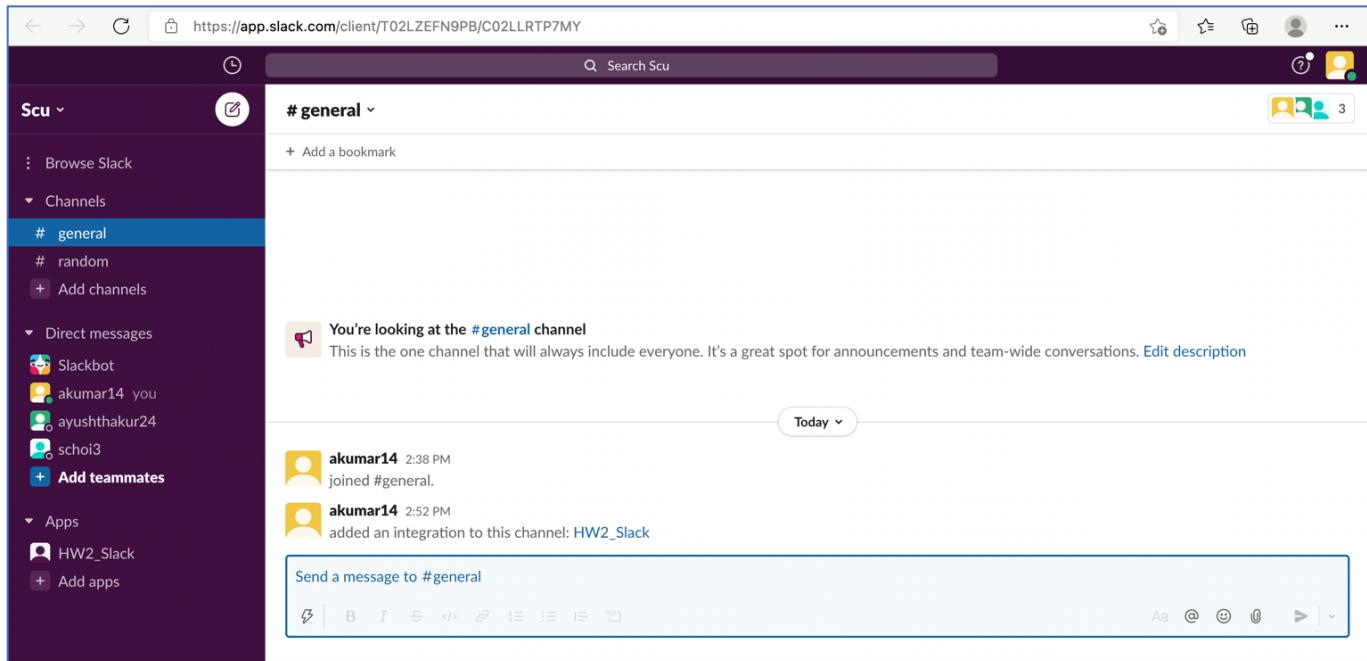
```

[akumar14@akumar14:~/functions$ sudo curl http://127.0.0.1:8080/function/slack-interactive -d '{"Hello": "Hello I am learning"}' ]
{"attachments": [{"footer": "Slack Apps built on OpenFaas", "author_link": "https://github.com/KumarAnkita/COEN-HW2.git", "color": "#36a64f", "text": "Head over to COEN 241", "title": "COEN 241", "ts": 123456789, "author_name": "Ankita Kumar", "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-amp-photography/visual-identity-toolkit/logos-amp-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!", "ky": "Hello I am learning", "thumb_url": "https://www.scu.edu/engineering/academic-programs/department-of-computer-engineering/graduate/course-descriptions/", "author_icon": "https://github.com/KumarAnkita/KumarAnkita.git", "fallback": "Required plain-text summary of the attachment."}]}
akumar14@akumar14:~/functions$ 

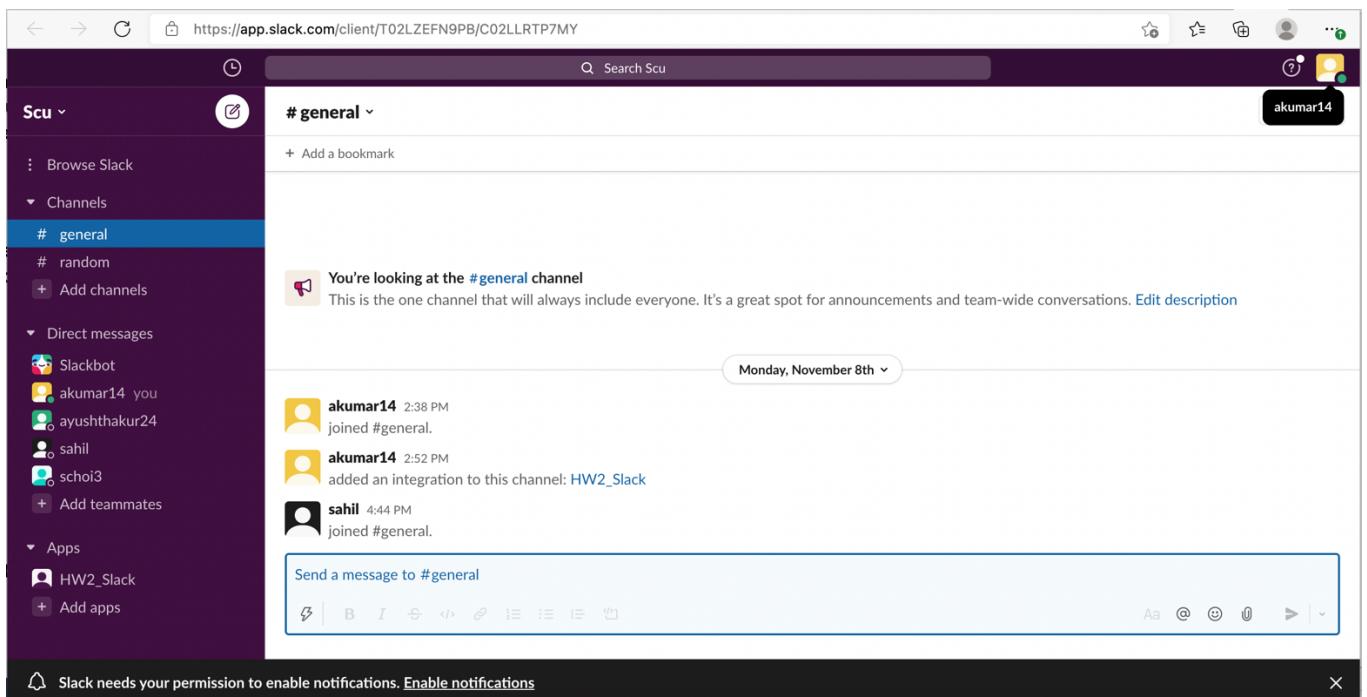
```

Link to the Slack application

scu-lc82581.slack.com



The screenshot shows the Slack application interface. The left sidebar has a dark purple background with white text. It includes sections for 'Browse Slack', 'Channels' (with '# general' selected), 'Direct messages', and 'Apps'. Under 'Channels', there are links for Slackbot, akumar14, ayushtakur24, schoi3, HW2_Slack, and Add teammates. The main area is titled '# general' and contains a message from akumar14 at 2:38 PM stating they joined the channel. Below that, another message from akumar14 at 2:52 PM says they added an integration to the channel: HW2_Slack. A message input field is at the bottom.



This screenshot is similar to the one above, showing the Slack interface. The left sidebar is identical. The main area shows the same messages from akumar14. However, a user profile overlay for 'akumar14' is visible in the top right corner of the main window. At the bottom of the screen, a black bar displays the message: 'Slack needs your permission to enable notifications. Enable notifications' with a close button ('X') on the right.

Docker Image:

The screenshot shows the Docker desktop application interface. The left sidebar has options: Containers / Apps, Images (selected), Volumes, and Dev Environments (with a PREVIEW button). The main area title is "Images on disk". It shows 4 images with a total size of 1.16 GB. A progress bar indicates usage (IN USE) and unused space. Buttons for Upgrade, Settings, Help, and Clean up... are at the top right. The central table lists local repositories under "LOCAL" and remote repositories under "REMOTE REPOSITORIES". The user "ankitakumar14" is selected. The table columns are TAGS, OS, VULNERABILITIES, LAST PUSHED, and SIZE. Three entries are shown:

TAGS	OS	VULNERABILITIES	LAST PUSHED	SIZE
ankitakumar14/slack-inter...	latest	Not available	about 1 hour ago	31.47 MB
ankitakumar14/hello-python	latest	Not available	about 1 hour ago	31.47 MB
ankitakumar14/slack-que...	latest	Not available	3 minutes ago	31.47 MB

At the bottom, there are buttons for Repositories per page (5), page navigation (1-3 of 3), and search.