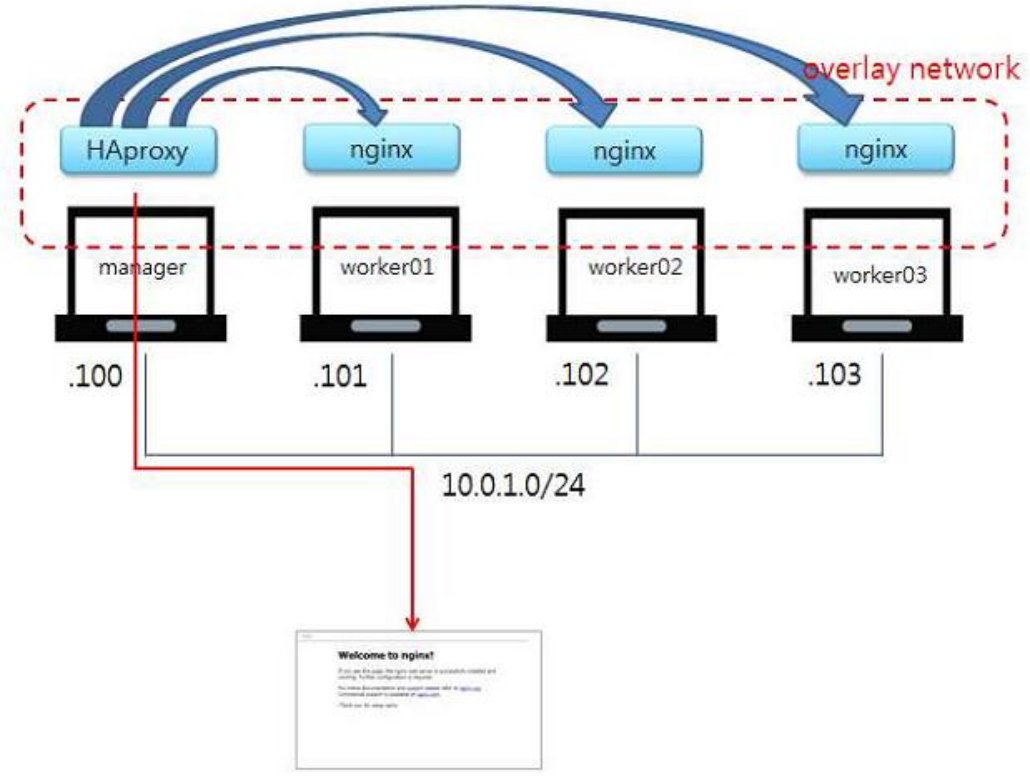
- **Docker swarm + HAproxy + Nginx 를 활용한 Web service 와 Load Balancing**

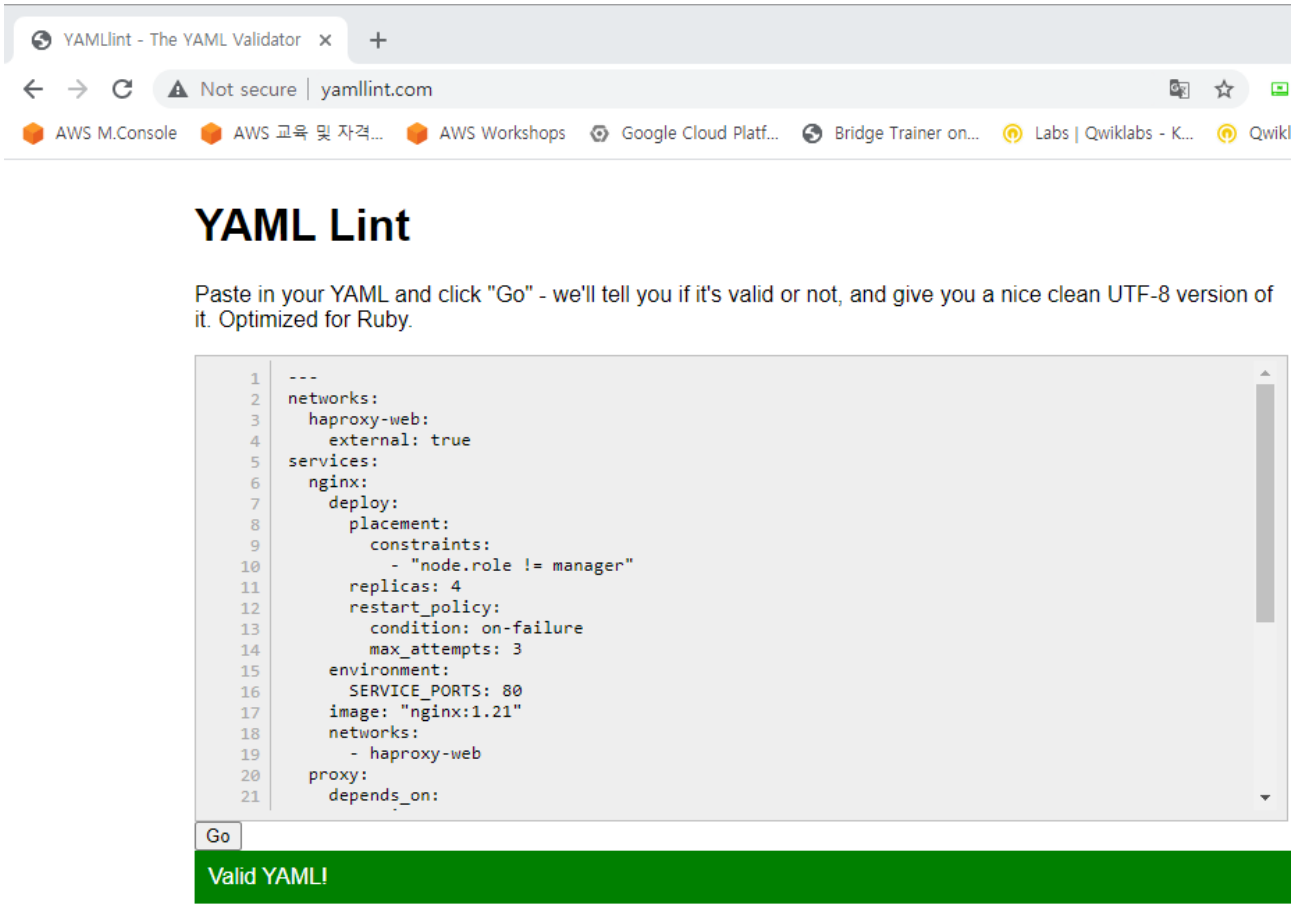


Swarm-manager 에 haproxy 를 설치한 뒤 해당 IP 로 웹 접속이 있을 경우 이를 동일 overlay 네트워크 내에 있는 nginx 컨테이너로 트래픽을 분산시켜 주는 방법이다. 물론 HAproxy 의 설정은 각 인프라의 구성환경에 따라 달라질 수 있으나 본 실습에서는 편의상 위와 같은 방법을 고려하여 환경을 구성해 보자.

[실습]

```
kevin@swarm-manager:~$ mkdir haproxy-nginx
kevin@swarm-manager:~$ cd haproxy-nginx/
kevin@swarm-manager:~/haproxy-nginx$ docker network create --driver=overlay --attachable haproxy-web
g7tv74ev7ix0828h7jg6el3fm
kevin@swarm-manager:~/haproxy-nginx$ docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
g7tv74ev7ix0        haproxy-web         overlay             swarm
```

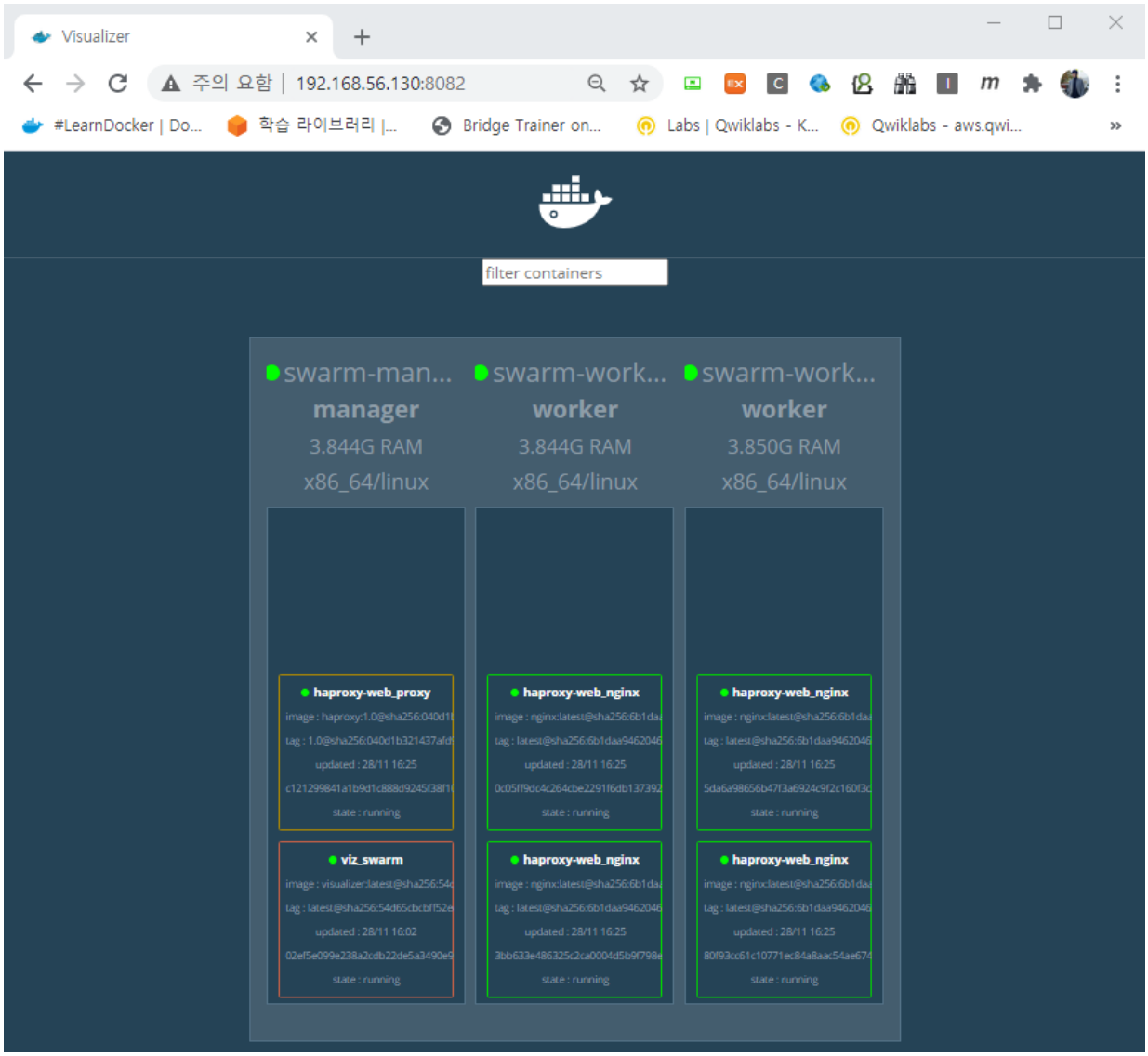
```
kevin@swarm-manager:~/haproxy-nginx$ vi haproxy-web.yaml


version: '3'
services:
  nginx:
    image: nginx:1.23.1-alpine
    deploy:
      replicas: 4
      placement:
        constraints: [node.role != manager]
      restart_policy:
        condition: on-failure
        max_attempts: 3
    environment:
      SERVICE_PORTS: 80
    networks:
      - haproxy-web

  proxy:
    image: dbgurum/haproxy:1.0
    depends_on:
      - nginx
    volumes:
      - /var/run/docker.sock:/var/run/docker.sock
    ports:
      - 80:80
    networks:
      - haproxy-web
    deploy:
      mode: global
      placement:
        constraints: [node.role == manager]

networks:
  haproxy-web:
    external: true
```



docker stack 구성 (한 스택에는 한 개 이상의 서비스, 네트워크, 볼륨을 정의할 수 있다.)

```
kevin@swarm-manager:~/haproxy-nginx$ docker stack deploy --compose-file=haproxy-web.yaml haproxy-web

Creating service haproxy-web_nginx

Creating service haproxy-web_proxy

kevin@swarm-manager:~/haproxy-nginx$ docker service ls


kevin@swarm-manager:~/haproxy-nginx$ docker stack services haproxy-web

ID                  NAME                MODE                REPLICAS            IMAGE                 PORTS

j428s95gvqez        haproxy-web_proxy   global              1/1                 dbgurum/haproxy:1.0   *:80->80/tcp

nnzn4sq54m9j        haproxy-web_nginx   replicated          4/4                 nginx:latest
```

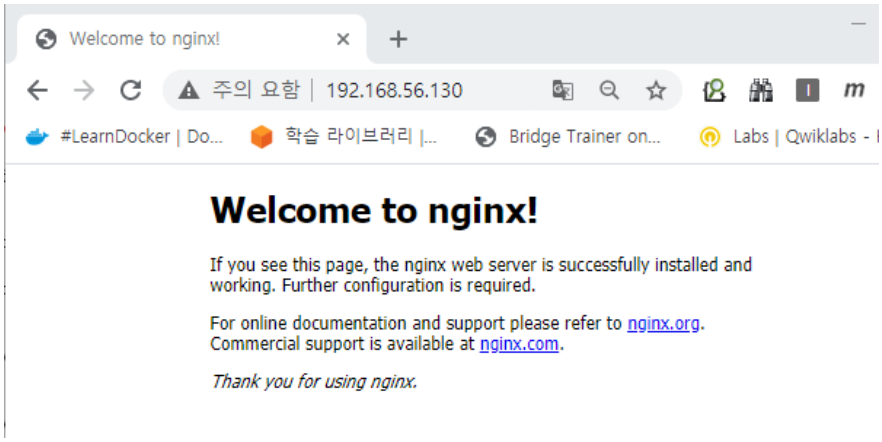
visualizer 에서 배치 확인



결과적으로 haproxy 주소로 접속을 시도하면 실제 웹 서비스를 제공하고 있는 컨테이너로 연결을 포워딩 해주게 된다.

```
kevin@swarm-manager:~/haproxy-nginx$ docker stack ps haproxy-web

ID                  NAME                                    IMAGE               NODE                DESIRED STATE
CURRENT STATE               ERROR               PORTS

ngh3acv3d8so        haproxy-web_proxy.dfct02ge61fe4qyusvosfgrf5   dbgurum/haproxy:1.0   swarm-manager       Running
Running about a minute ago

ra8acw9lcb51        haproxy-web_nginx.1                     nginx:latest        swarm-worker1       Running
Running about a minute ago

mi2bua0pp9zt        haproxy-web_nginx.2                     nginx:latest        swarm-worker2       Running
Running about a minute ago
```

```
yc9pcpo0keeh        haproxy-web_nginx.3                 nginx:latest          swarm-worker1       Running
Running about a minute ago

nxhq7reulvo8        haproxy-web_nginx.4                 nginx:latest          swarm-worker2       Running
Running about a minute ago
```



생성된 서비스의 로그 확인

```
kevin@swarm-manager:~/haproxy-nginx$ docker service logs -f haproxy-web_nginx

haproxy-web_nginx.1.ra8acw9lcb51@swarm-worker1    | 10.0.1.10 - - [28/Nov/2020:07:59:38 +0000] "GET / HTTP/1.1" 304 0 "-"
"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.198 Safari/537.36" "10.0.0.2"

haproxy-web_nginx.2.mi2bua0pp9zt@swarm-worker2    | 10.0.1.10 - - [28/Nov/2020:07:59:38 +0000] "GET / HTTP/1.1" 304 0 "-"
"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.198 Safari/537.36" "10.0.0.2"

haproxy-web_nginx.3.yc9pcpo0keeh@swarm-worker1    | 10.0.1.10 - - [28/Nov/2020:07:59:39 +0000] "GET / HTTP/1.1" 304 0 "-"
"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.198 Safari/537.36" "10.0.0.2"

haproxy-web_nginx.4.nxhq7reulvo8@swarm-worker2    | 10.0.1.10 - - [28/Nov/2020:07:59:39 +0000] "GET / HTTP/1.1" 304 0 "-"
"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.198 Safari/537.36" "10.0.0.2"

haproxy-web_nginx.1.ra8acw9lcb51@swarm-worker1    | 10.0.1.10 - - [28/Nov/2020:07:59:39 +0000] "GET / HTTP/1.1" 304 0 "-"
"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.198 Safari/537.36" "10.0.0.2"

haproxy-web_nginx.2.mi2bua0pp9zt@swarm-worker2    | 10.0.1.10 - - [28/Nov/2020:07:59:43 +0000] "GET / HTTP/1.1" 304 0 "-"
"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.198 Safari/537.36" "10.0.0.2"

haproxy-web_nginx.3.yc9pcpo0keeh@swarm-worker1    | 10.0.1.10 - - [28/Nov/2020:07:59:43 +0000] "GET / HTTP/1.1" 304 0 "-"
"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.198 Safari/537.36" "10.0.0.2"

haproxy-web_nginx.4.nxhq7reulvo8@swarm-worker2    | 10.0.1.10 - - [28/Nov/2020:07:59:44 +0000] "GET / HTTP/1.1" 304 0 "-"
"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.198 Safari/537.36" "10.0.0.2"

…
```