Service Mesh- Service to Service Communicator

- Service Mesh는 마이크로서비스 간의 통신(네트워크)을 담당하는 요소
- 통신 및 네트워크 기능을 비즈니스 로직과 분리한 네트워크 통신 인프라
- 서비스간 통신을 위해서는 Service Discovery, Fault Tolerance, Traffic Routing, Security 등의 기능 필요

API Gateway vs. Service Mesh

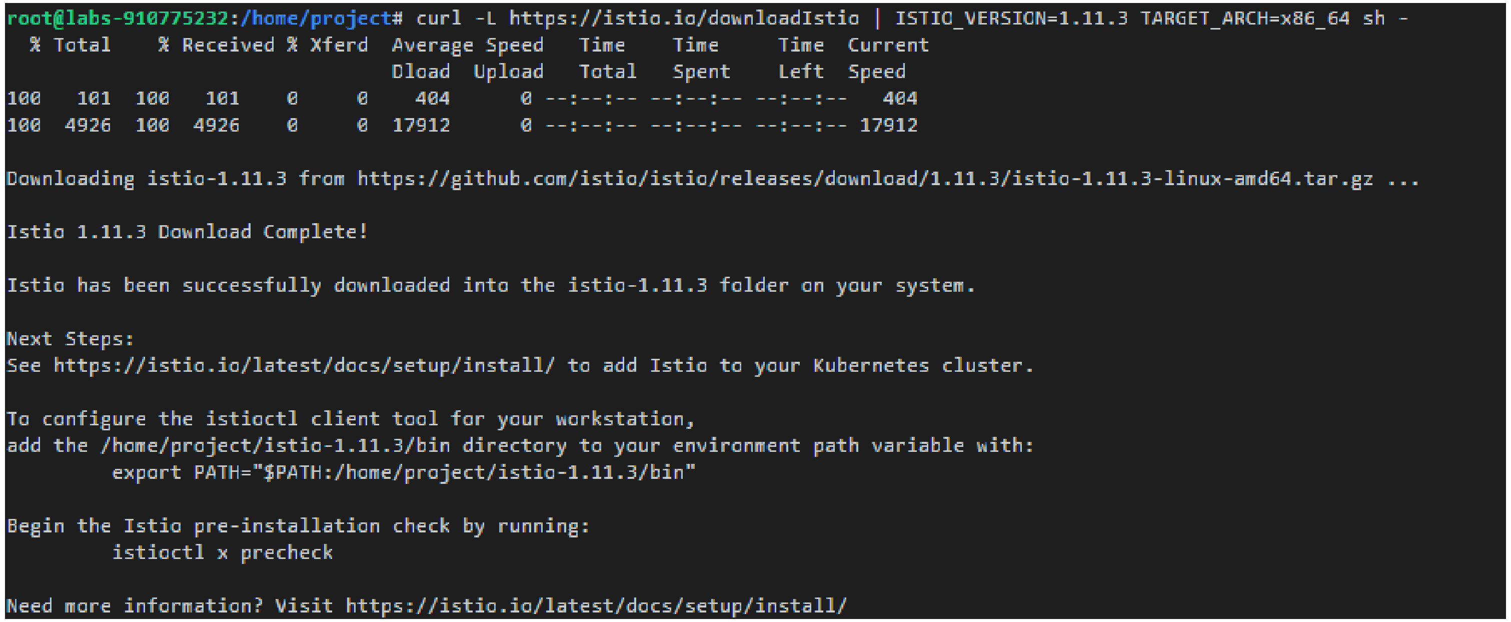
- **API Gateway는 마이크로서비스 그룹의 외부 경계에 위치하여 역할을 수행하지만, Service Mesh는 경계 내부에서 그 역할을 수행**

	API Gateway	Service Mesh
라우팅 주체	• 서버	• 요청하는 서비스
라우팅 구성요소	• 별도의 네트워크를 도입하는 독립적인 API Gateway 구성요소	• Service 내 SideCar로 Local network 스택의 일부가 됨
로드 밸런싱	• 단일 엔드포인트를 제공하고, API Gateway 내 로드밸런싱을 담당하는 구성요소에 요청을 redirection하여 해당 구성요소가 처리함	• Service Registry에서 서비스 목록을 수신함. Sidecar에서 로드밸런싱 알고리즘을 통해 수행함
네트워크	• 외부 인터넷과 내부 서비스 네트워크 사이에 위치함	• 내부 서비스 네트워크 사이에 위치하며, 응용프로그램의 네트워크 경계 내에서만 통신을 가능하게 함
트레이싱	• API에 대한 사용자 및 공급자에 대한 모든 호출에 대해 수집되고 분석됨	• Mesh 내 모든 마이크로서비스 구성요소에 대해 분석가능

출처: https://velog.io/@tedigom/MSA-%EC%A0%9C%EB%8C%80%EB%A1%9C-%EC%9D%B4%ED%95%B4%ED%95%98%EA%B8%B0-4Service-Mesh-f8k317qn1b

Istio 설치하기

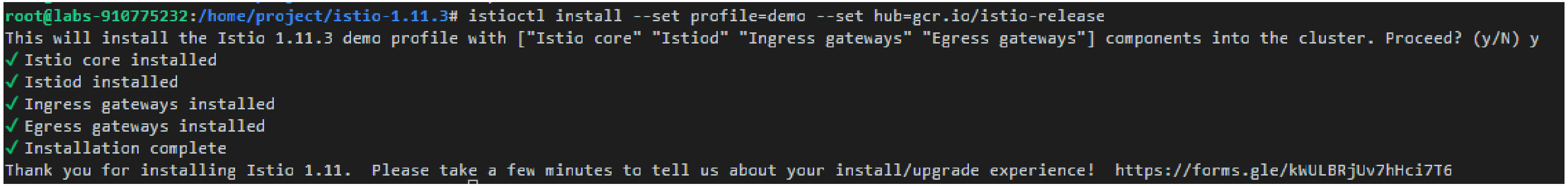
curl -L https://istio.io/downloadIstio | ISTIO_VERSION=1.11.3 TARGET_ARCH=x86_64 sh -



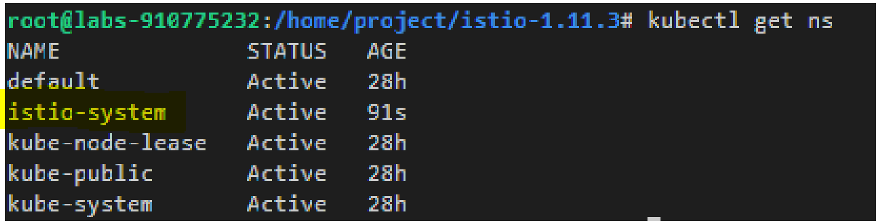
```
root@labs-910775232:/home/project# curl -L https://istio.io/downloadIstio | ISTIO_VERSION=1.11.3 TARGET_ARCH=x86_64 sh -
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   101  100   101    0     0    404      0 --:--:-- --:--:-- --:--:--   404
100  4926  100  4926    0     0  17912      0 --:--:-- --:--:-- --:--:-- 17912

Downloading istio-1.11.3 from https://github.com/istio/istio/releases/download/1.11.3/istio-1.11.3-linux-amd64.tar.gz ...

Istio 1.11.3 Download Complete!

Istio has been successfully downloaded into the istio-1.11.3 folder on your system.

Next Steps:
See https://istio.io/latest/docs/setup/install/ to add Istio to your Kubernetes cluster.

To configure the istioctl client tool for your workstation,
add the /home/project/istio-1.11.3/bin directory to your environment path variable with:
         export PATH="$PATH:/home/project/istio-1.11.3/bin"

Begin the Istio pre-installation check by running:
         istioctl x precheck

Need more information? Visit https://istio.io/latest/docs/setup/install/
```

istioctl install --set profile=demo --set hub=gcr.io/istio-release

Set을 안해주면 docker hub꺼 자동으로 사용하게 됨



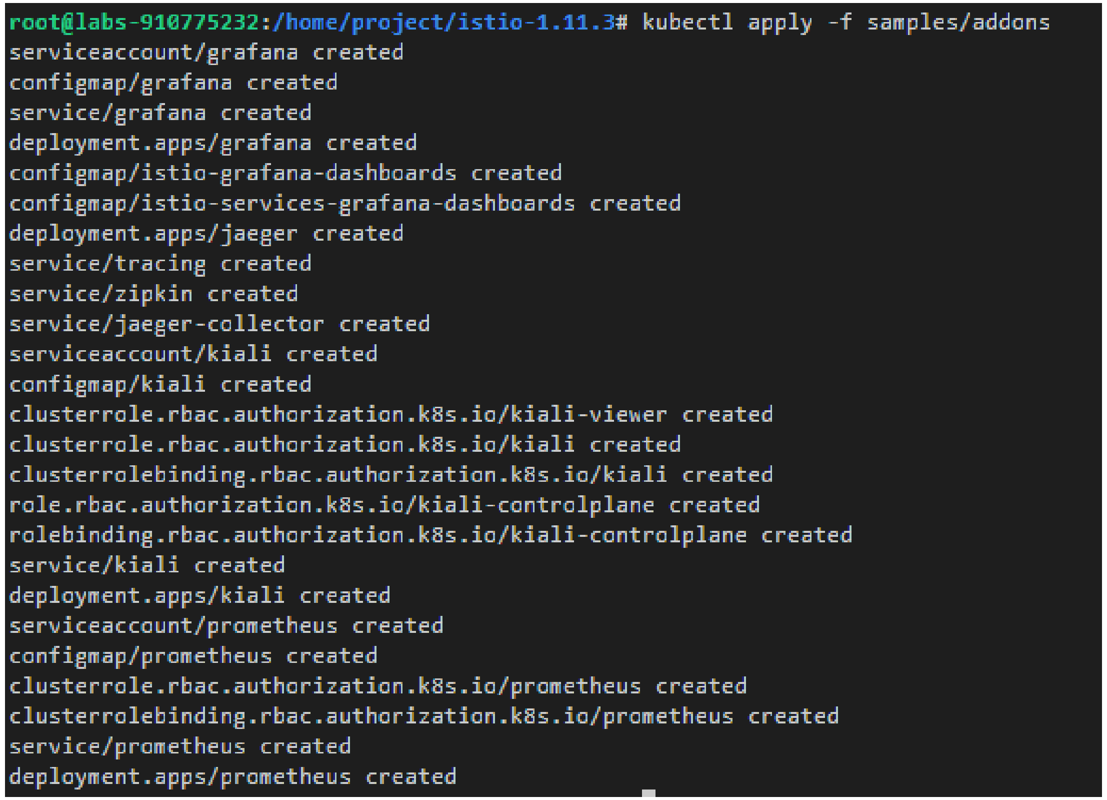
```
root@labs-910775232:/home/project/istio-1.11.3# istioctl install --set profile=demo --set hub=gcr.io/istio-release
This will install the Istio 1.11.3 demo profile with ["Istio core" "Istiod" "Ingress gateways" "Egress gateways"] components into the cluster. Proceed? (y/N) y
✓ Istio core installed
✓ Istiod installed
✓ Ingress gateways installed
✓ Egress gateways installed
✓ Installation complete
Thank you for installing Istio 1.11.  Please take a few minutes to tell us about your install/upgrade experience!  https://forms.gle/kWULBRjUv7hHci7T6
```



```
root@labs-910775232:/home/project/istio-1.11.3# kubectl get ns
NAME              STATUS   AGE
default           Active   28h
istio-system      Active   91s
kube-node-lease   Active   28h
kube-public       Active   28h
kube-system       Active   28h
```

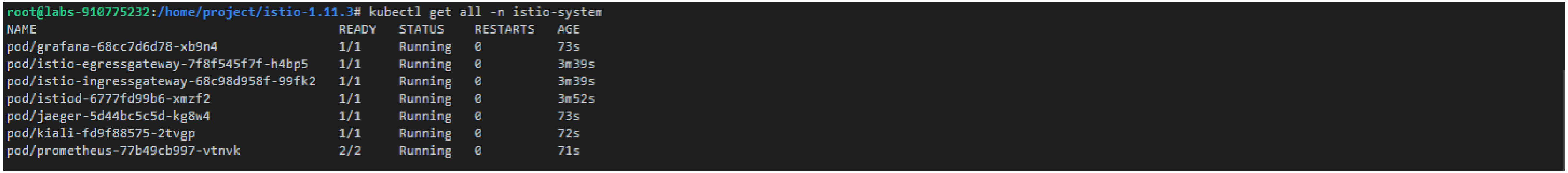
Istio 모니터링 툴(Telemetry Applications) 설치

kubectl apply -f samples/addons



```
root@labs-910775232:/home/project/istio-1.11.3# kubectl apply -f samples/addons
serviceaccount/grafana created
configmap/grafana created
service/grafana created
deployment.apps/grafana created
configmap/istio-grafana-dashboards created
configmap/istio-services-grafana-dashboards created
deployment.apps/jaeger created
service/tracing created
service/zipkin created
service/jaeger-collector created
serviceaccount/kiali created
configmap/kiali created
clusterrole.rbac.authorization.k8s.io/kiali-viewer created
clusterrole.rbac.authorization.k8s.io/kiali created
clusterrolebinding.rbac.authorization.k8s.io/kiali created
role.rbac.authorization.k8s.io/kiali-controlplane created
rolebinding.rbac.authorization.k8s.io/kiali-controlplane created
service/kiali created
deployment.apps/kiali created
serviceaccount/prometheus created
configmap/prometheus created
clusterrole.rbac.authorization.k8s.io/prometheus created
clusterrolebinding.rbac.authorization.k8s.io/prometheus created
service/prometheus created
deployment.apps/prometheus created
```

kubectl get all -n istio-system

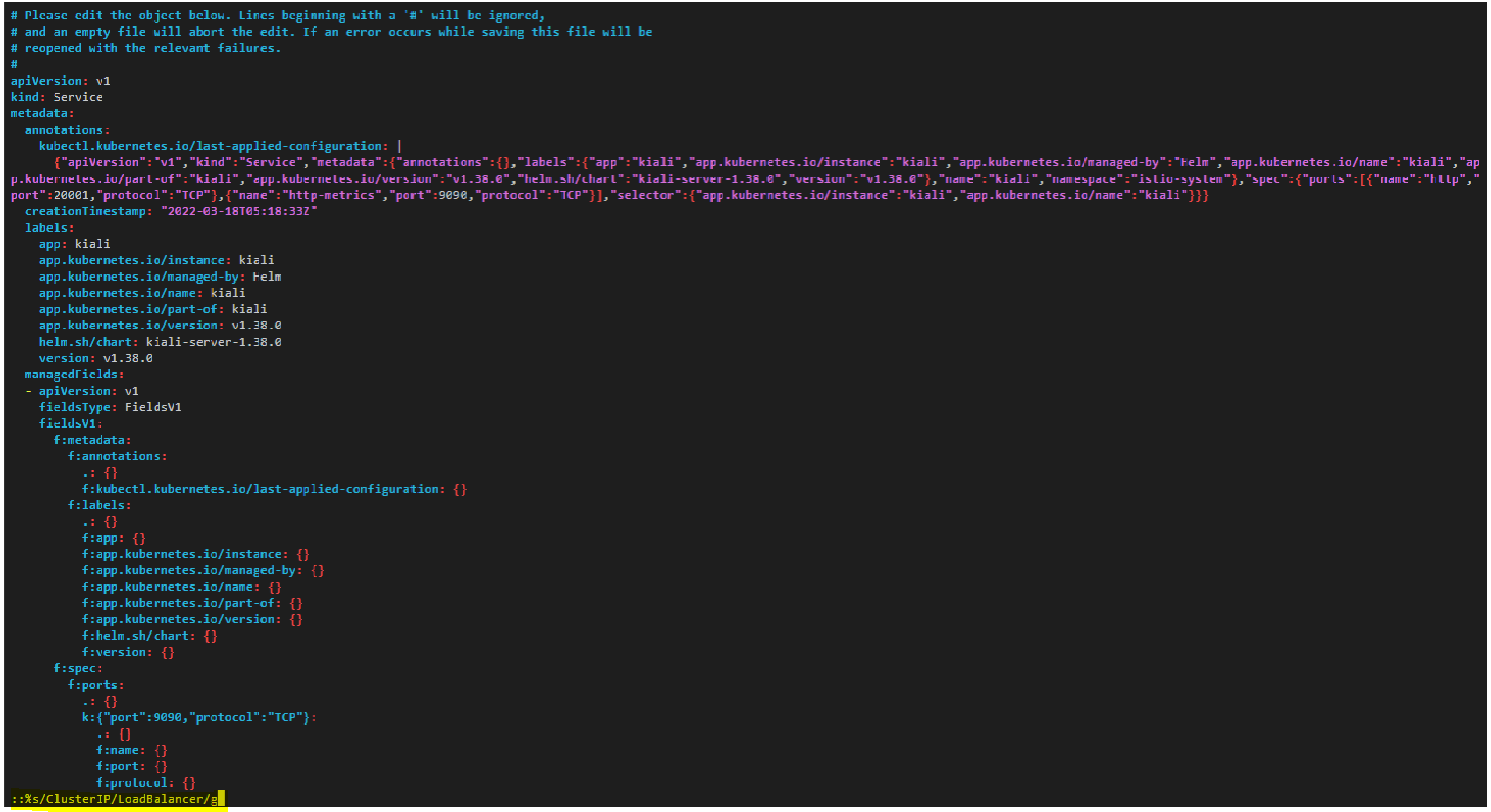


```
root@labs-910775232:/home/project/istio-1.11.3# kubectl get all -n istio-system
NAME                                      READY   STATUS    RESTARTS   AGE
pod/grafana-68cc7d6d78-xb9n4              1/1     Running   0          73s
pod/istio-egressgateway-7f8f545f7f-h4bp5  1/1     Running   0          3m39s
pod/istio-ingressgateway-68c98d958f-99fk2 1/1     Running   0          3m39s
pod/istiod-6777fd99b6-xmzf2               1/1     Running   0          3m52s
pod/jaeger-5d44bc5c5d-kg8w4               1/1     Running   0          73s
pod/kiali-fd9f88575-2tvgp                 1/1     Running   0          72s
pod/prometheus-77b49cb997-vtnvk           2/2     Running   0          71s
```

Monitoring Server – Kiali 설정

```
kubectl edit svc kiali -n istio-system
:%s/ClusterIP/LoadBalancer/g
:wq!
```

기본 ServiceType 변경 : ClusterIP 를 LoadBalancer 로



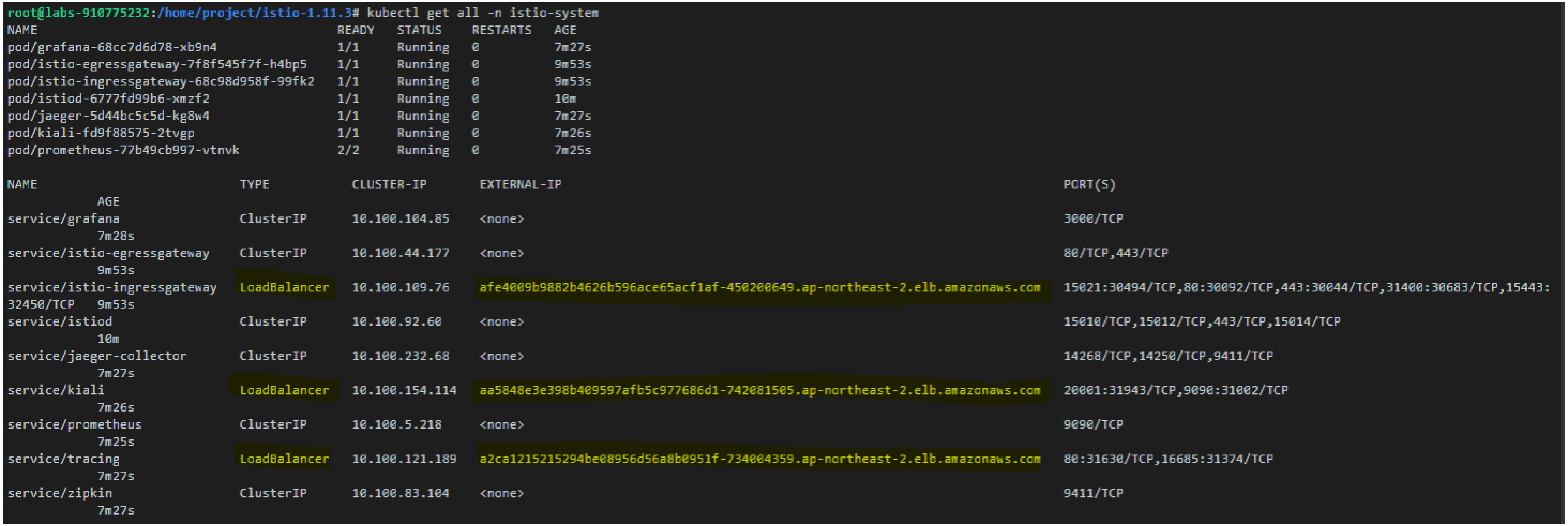
```
# Please edit the object below. Lines beginning with a '#' will be ignored,
# and an empty file will abort the edit. If an error occurs while saving this file will be
# reopened with the relevant failures.
#
apiVersion: v1
kind: Service
metadata:
  annotations:
    kubectl.kubernetes.io/last-applied-configuration: |
      {"apiVersion":"v1","kind":"Service","metadata":{"annotations":{},"labels":{"app":"kiali","app.kubernetes.io/instance":"kiali","app.kubernetes.io/managed-by":"Helm","app.kubernetes.io/name":"kiali","ap
p.kubernetes.io/part-of":"kiali","app.kubernetes.io/version":"v1.38.0","helm.sh/chart":"kiali-server-1.38.0","version":"v1.38.0"},"name":"kiali","namespace":"istio-system"},"spec":{"ports":[{"name":"http","
port":20001,"protocol":"TCP"},{"name":"http-metrics","port":9090,"protocol":"TCP"}],"selector":{"app.kubernetes.io/instance":"kiali","app.kubernetes.io/name":"kiali"}}}
  creationTimestamp: "2022-03-18T05:18:33Z"
  labels:
    app: kiali
    app.kubernetes.io/instance: kiali
    app.kubernetes.io/managed-by: Helm
    app.kubernetes.io/name: kiali
    app.kubernetes.io/part-of: kiali
    app.kubernetes.io/version: v1.38.0
    helm.sh/chart: kiali-server-1.38.0
    version: v1.38.0
  managedFields:
  - apiVersion: v1
    fieldsType: FieldsV1
    fieldsV1:
      f:metadata:
        f:annotations:
          .: {}
          f:kubectl.kubernetes.io/last-applied-configuration: {}
        f:labels:
          .: {}
          f:app: {}
          f:app.kubernetes.io/instance: {}
          f:app.kubernetes.io/managed-by: {}
          f:app.kubernetes.io/name: {}
          f:app.kubernetes.io/part-of: {}
          f:app.kubernetes.io/version: {}
          f:helm.sh/chart: {}
          f:version: {}
      f:spec:
        f:ports:
          .: {}
          k:{"port":9090,"protocol":"TCP"}:
            .: {}
            f:name: {}
            f:port: {}
            f:protocol: {}
::%s/ClusterIP/LoadBalancer/g
```

Tracing Server - Jaeger

```
kubectl edit svc tracing -n istio-system
:%s/ClusterIP/LoadBalancer/g
 :wq!
```

기본 ServiceType 변경 : ClusterIP 를 LoadBalancer 로...

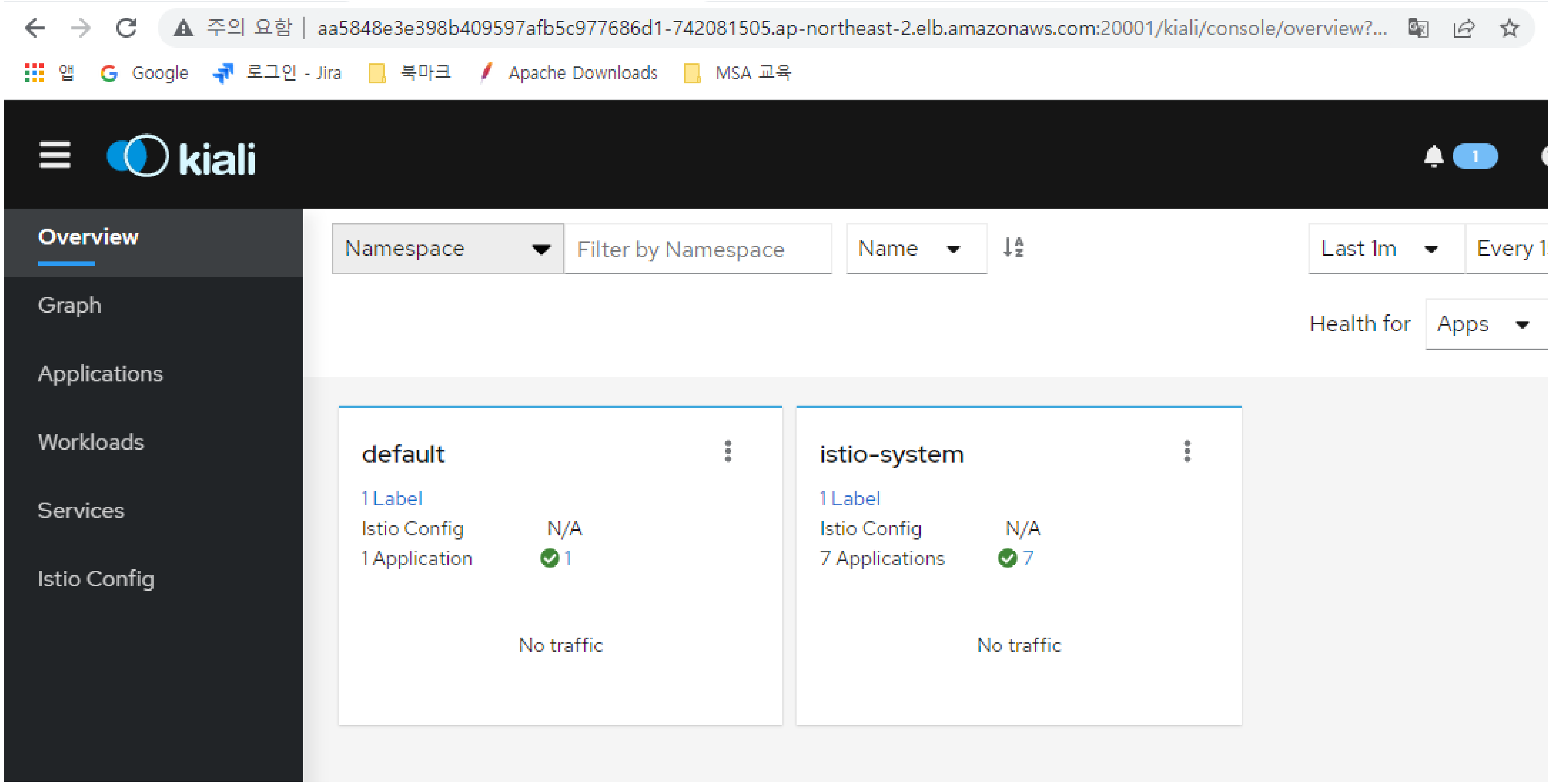
Kiali / Jaeger의 설치 확인 (External IP 확인)



```
root@labs-910775232:/home/project/istio-1.11.3# kubectl get all -n istio-system
NAME                                        READY   STATUS    RESTARTS   AGE
pod/grafana-68cc7d6d78-xb9n4                1/1     Running   0          7m27s
pod/istio-egressgateway-7f8f545f7f-h4bp5    1/1     Running   0          9m53s
pod/istio-ingressgateway-68c98d958f-99fk2   1/1     Running   0          9m53s
pod/istiod-6777fd99b6-xmzf2                 1/1     Running   0          10m
pod/jaeger-5d44bc5c5d-kg8w4                 1/1     Running   0          7m27s
pod/kiali-fd9f88575-2tvgp                   1/1     Running   0          7m26s
pod/prometheus-77b49cb997-vtnvk             2/2     Running   0          7m25s

NAME                           TYPE           CLUSTER-IP       EXTERNAL-IP                                                                   PORT(S)
            AGE
service/grafana                ClusterIP      10.100.104.85    <none>                                                                        3000/TCP
            7m28s
service/istio-egressgateway    ClusterIP      10.100.44.177    <none>                                                                        80/TCP,443/TCP
            9m53s
service/istio-ingressgateway   LoadBalancer   10.100.109.76    afe4009b9882b4626b596ace65acf1af-450200649.ap-northeast-2.elb.amazonaws.com   15021:30494/TCP,80:30092/TCP,443:30044/TCP,31400:30683/TCP,15443:
32450/TCP   9m53s
service/istiod                 ClusterIP      10.100.92.60     <none>                                                                        15010/TCP,15012/TCP,443/TCP,15014/TCP
            10m
service/jaeger-collector       ClusterIP      10.100.232.68    <none>                                                                        14268/TCP,14250/TCP,9411/TCP
            7m27s
service/kiali                  LoadBalancer   10.100.154.114   aa5848e3e398b409597afb5c977686d1-742081505.ap-northeast-2.elb.amazonaws.com   20001:31943/TCP,9090:31002/TCP
            7m26s
service/prometheus             ClusterIP      10.100.5.218     <none>                                                                        9090/TCP
            7m25s
service/tracing                LoadBalancer   10.100.121.189   a2ca1215215294be08956d56a8b0951f-734004359.ap-northeast-2.elb.amazonaws.com   80:31630/TCP,16685:31374/TCP
            7m27s
service/zipkin                 ClusterIP      10.100.83.104    <none>                                                                        9411/TCP
            7m27s
```

Monitoring Server – Kiali 접속

EXTERNAL-IP aa5848e3e398b409597afb5c977686d1-742081505.ap-northeast-2.elb.amazonaws.com:20001

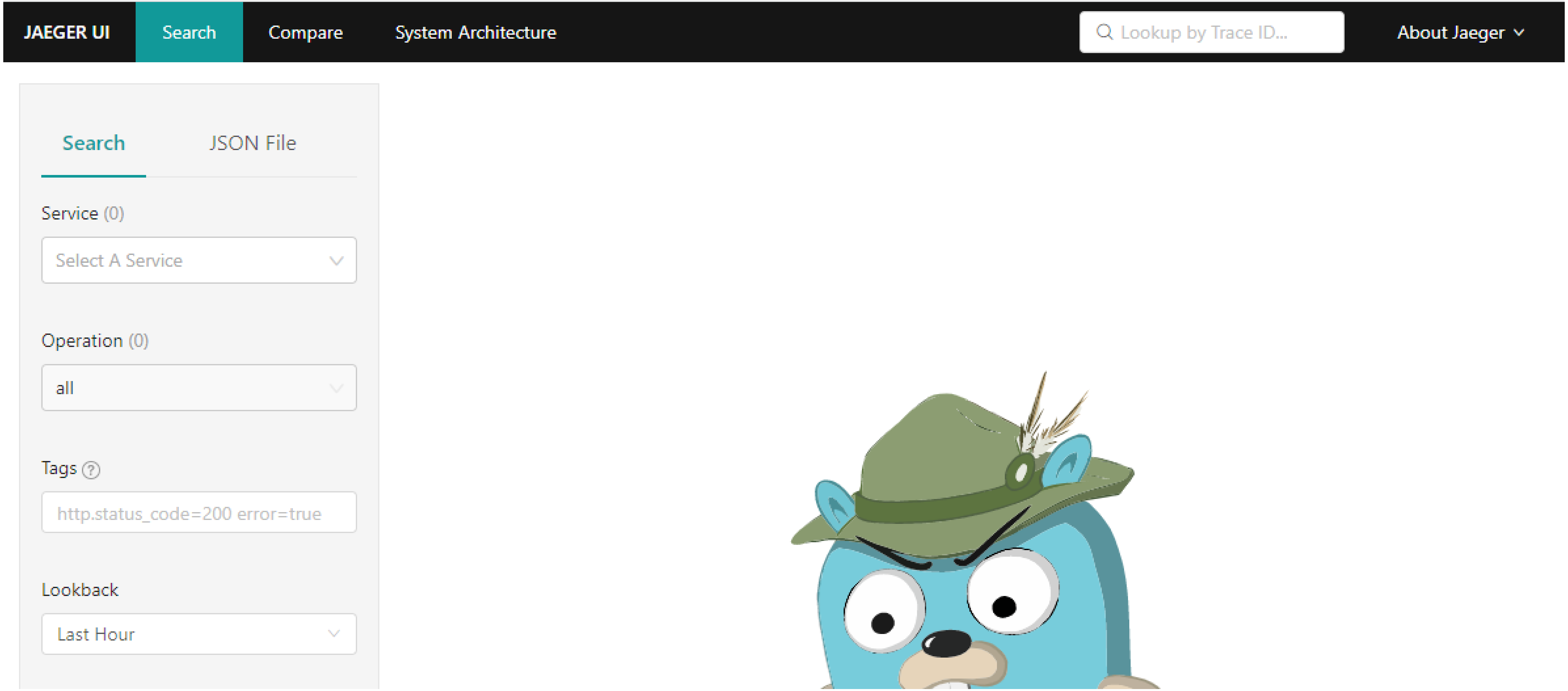


default
1 Label
Istio Config N/A
1 Application ✓ 1
No traffic

istio-system
1 Label
Istio Config N/A
7 Applications ✓ 7
No traffic

Tracing Server - Jaeger

EXTERNAL-IP a2ca1215215294be08956d56a8b0951f-734004359.ap-northeast-2.elb.amazonaws.com:80



Service (0)

Select A Service

Operation (0)

all

Tags

http.status_code=200 error=true

Lookback

Last Hour