for Beginner

Kubernetes Korea Group

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Kubernetes User Group (in Korea), 발표자

홈페이지 : https://www.facebook.com/groups/k8skr/

생성일 : 2016년 늦여름

인　원 : 1,100 여명

목　적 : Kubernetes 저변 확대, 스터디, 친목도모,
현재는 Cloud Native Computing 분야로 확대

- 안승규 (Seungkyu Ahn), seungkyua@gmail.com
- http://www.ahnseungkyu.com/
- Java Enterprise Application 개발, OpenStack 기반 Private Cloud 개발, Kubernetes 이것 저것
- Kubernetes Korea User Group 리더

Terminology 는 일단 몰라도 시작하자.

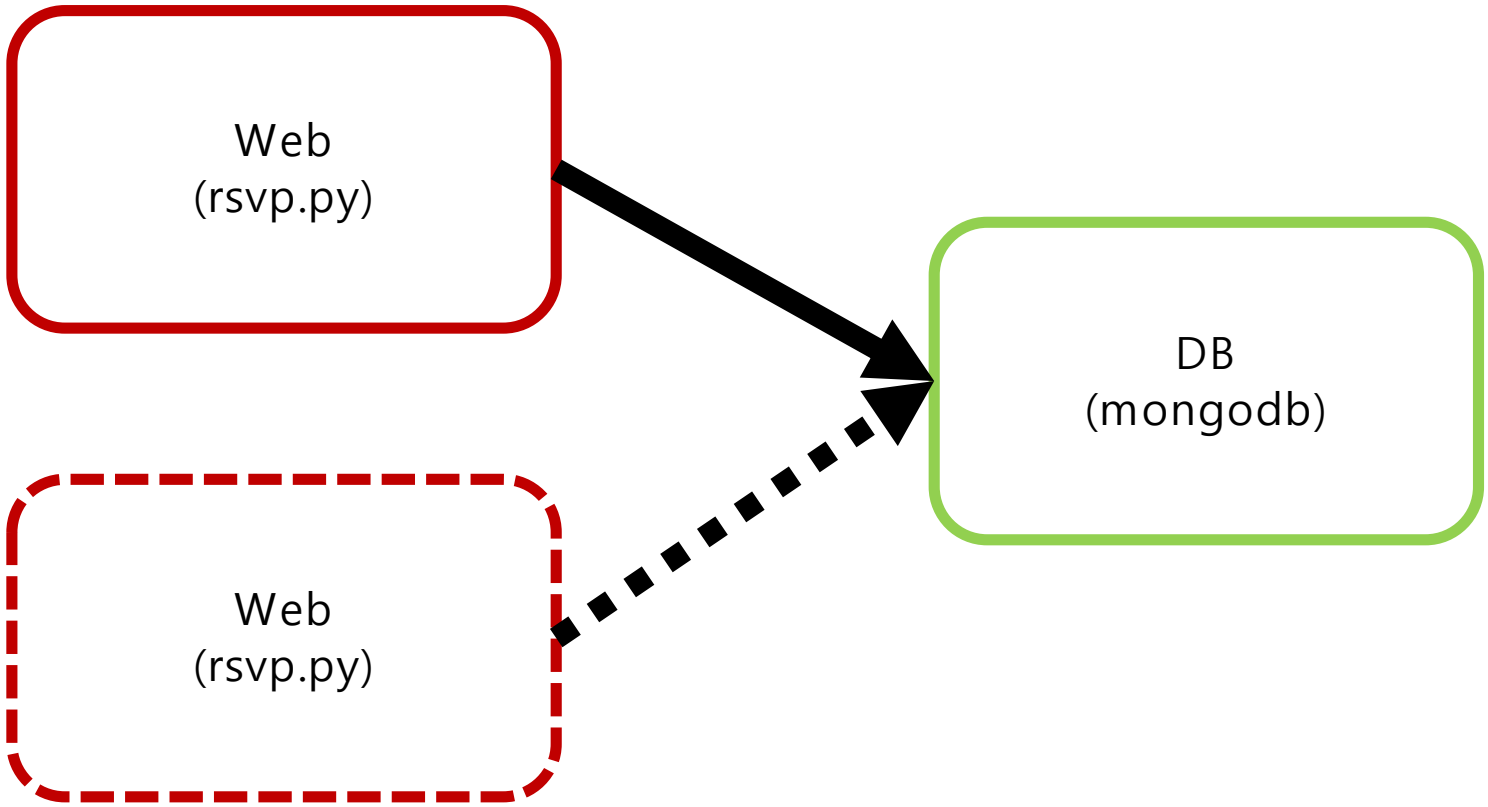
https://www.wordclouds.com/

SW Developer / SW Architect / System Engineer 가 고민하는 것

- DB 접속 IP와 Port를 어떻게 관리할까? DNS를 기반으로 연결하려면?.
- 애플리케이션을 멀티 인스턴스로 띄우고 이를 Load Balancer로 연결하는 방법은?
- 사용량이 급증하면 애플리케이션 자동 확장이 가능한가?
- 애플리케이션에 죽거나, hang이 걸리면 어떻게 자동으로 restart 해줄까?
- Container 가 배포/관리가 편한데 이를 쉽게 할 수 있는 방법은?
- 환경설정 파일을 쉽게 관리하고 싶은데.
- 애플리케이션을 누락없이 모든 서버에 한 번에 배포하고 싶은데

궁금하니 sample app 을 돌려봅시다.

https://github.com/seungkyua/rsvpapp



Kubernetes 환경은

NAME	STATUS	ROLES	AGE	VERSION
k1-master01	Ready	master	1d	v1.10.4
k1-master02	Ready	master	1d	v1.10.4
k1-master03	Ready	master	1d	v1.10.4
k1-node01	Ready	ingress,node	1d	v1.10.4
k1-node02	Ready	node	1d	v1.10.4
k1-node03	Ready	node	1d	v1.10.4
k1-node04	Ready	node	1d	v1.10.4

$ kubectl label node k1-node03 database=enabled

RSVP DB Deployment yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: rsvp-db
spec:
  replicas: 1
  selector:
    matchLabels:
      appdb: rsvpdb
  template:
    metadata:
      labels:
        appdb: rsvpdb
    spec:
      nodeSelector:
        database: enabled
      containers:
      - name: rsvp-db
        image: mongo:3.3
        ports:
        - containerPort: 27017
```

인스턴스 1개

DB를 찾아가는 방법

스케줄링

Docker hub

RSVP DB Service yaml

```
apiVersion: v1
kind: Service
metadata:
  name: mongodb
  labels:
    app: rsvpdb
spec:
  ports:
  - port: 27017
    targetPort: 27017
    protocol: TCP
  selector:
    appdb: rsvpdb
```

서곧디 (서비스 이름이 곧 디엔에스)

Service Port

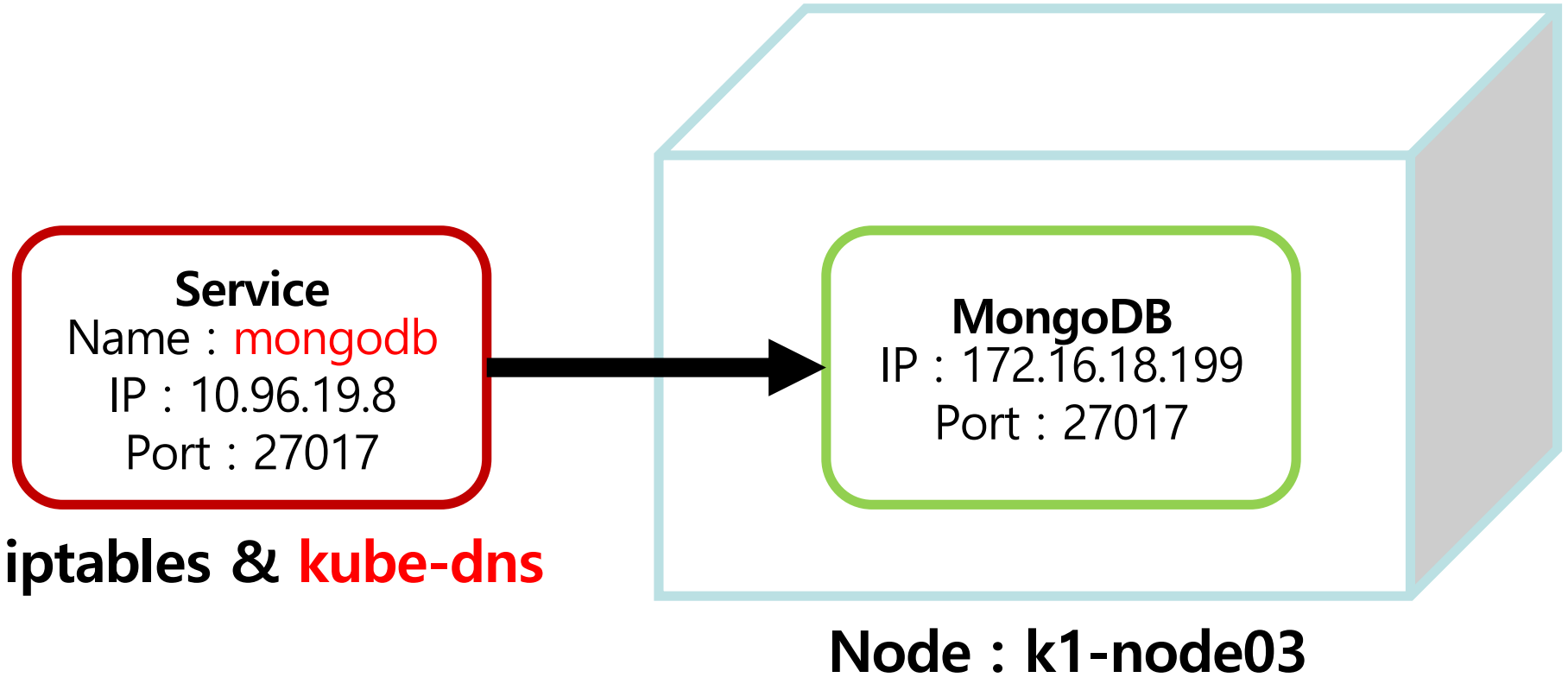
DB Port

DB와 연결

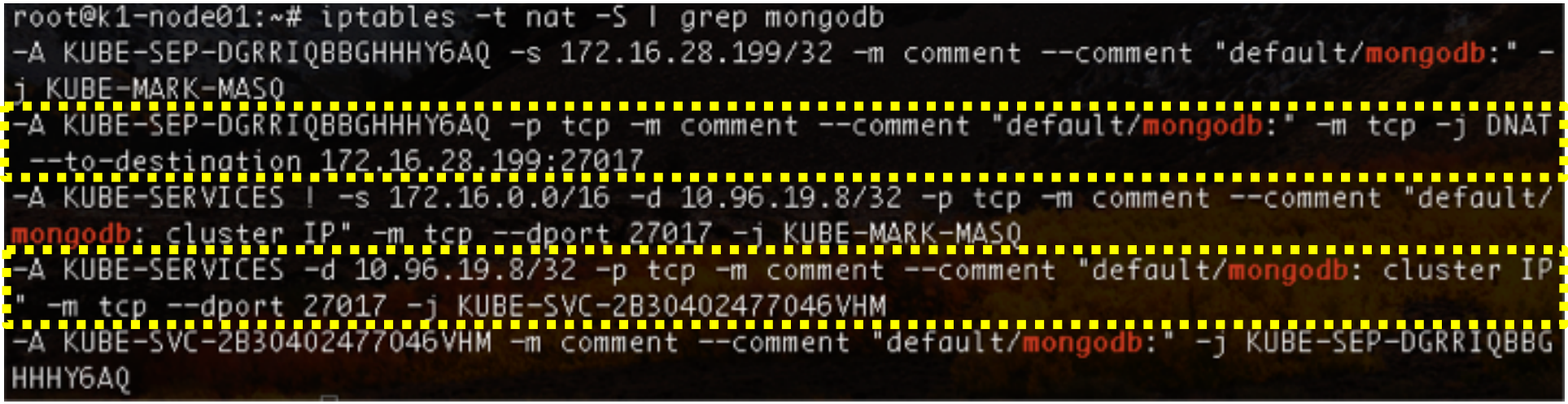
RSVP DB Artifact

```
root@k1-master01:kube# kubectl get pods -o wide
NAME                      READY     STATUS    RESTARTS   AGE       IP               NODE
rsvp-db-56c665b6b7-95q9t  1/1       Running   0          1m        172.16.28.199    k1-node03
root@k1-master01:kube# kubectl get svc -o wide
NAME         TYPE        CLUSTER-IP    EXTERNAL-IP   PORT(S)     AGE       SELECTOR
kubernetes   ClusterIP   10.96.0.1     <none>        443/TCP     1d        <none>
mongodb      ClusterIP   10.96.19.8    <none>        27017/TCP   1m        appdb=rsvpdb
```

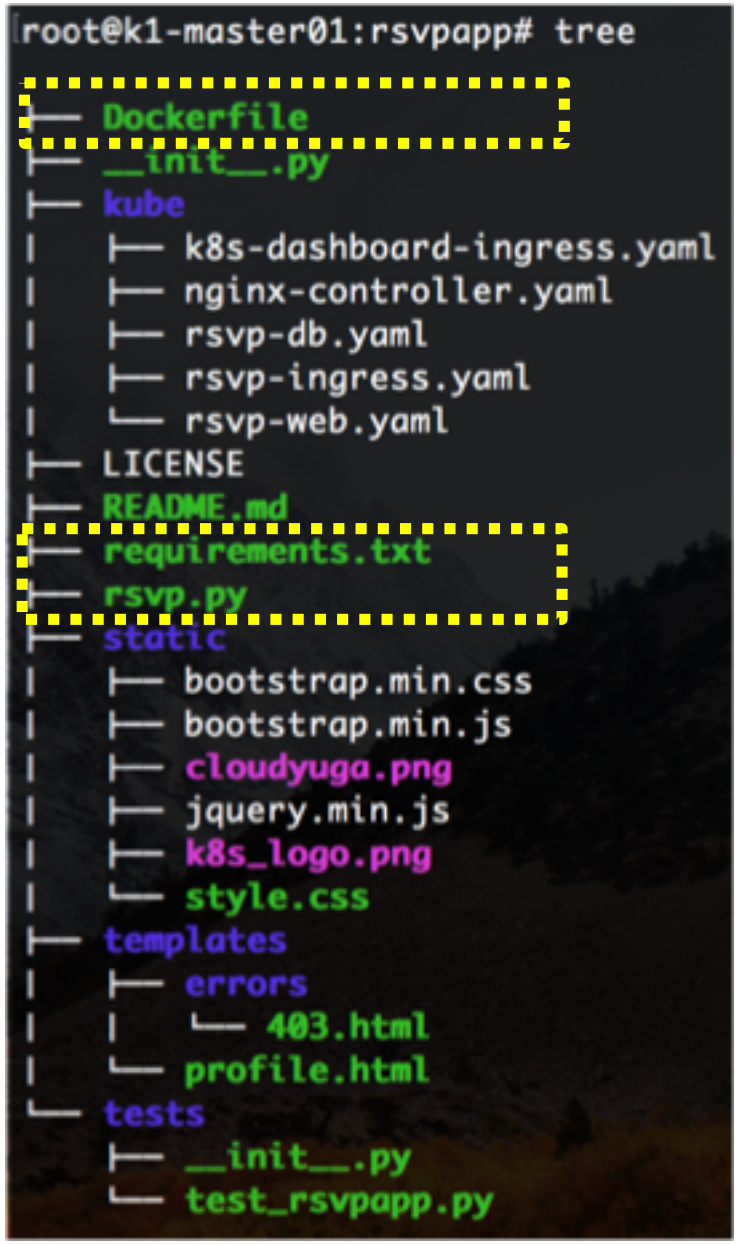
그럼 어떻게 구성된 거지?


Service
Name : mongodb
IP : 10.96.19.8
Port : 27017
MongoDB
IP : 172.16.18.199
Port : 27017
iptables & kube-dns
Node : k1-node03

RSVP Service iptables



RSVP Web source tree



RSVP Web Dockerfile

```
FROM python:3-alpine

LABEL maintainer seungkyua@gmail.com

RUN mkdir -p /app
ADD requirements.txt /app
RUN pip install -r /app/requirements.txt
COPY . /app
WORKDIR /app

ENV LINK https://www.facebook.com/groups/k8skr/
ENV TEXT1 Open Infra Day 2018
ENV TEXT2 Kubernetes User Group!
ENV LOGO https://raw.githubusercontent.com/seungkyua/rsvpapp/master/static/k8s_logo.png
ENV COMPANY Kubernetes User Group

EXPOSE 80
ENTRYPOINT ["python"]
CMD ["rsvp.py"]
```

RSVP Web source

rsvp.py

```
MONGODB_HOST=os.environ.get('MONGODB_HOST', 'localhost')
client = MongoClient(MONGODB_HOST, 27017)
```

RSVP Web Deployment yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: rsvp
spec:
  replicas: 1
  selector:
    matchLabels:
      app: rsvp
  template:
    metadata:
      labels:
        app: rsvp
spec:
  affinity:
    podAntiAffinity:
      requiredDuringSchedulingIgnoredDuringExecution:
      - topologyKey: kubernetes.io/hostname
        labelSelector:
          matchLabels:
            appdb: rsvpdb
  containers:
  - name: rsvp-app
    image: seungkyua/rsvpapp
    env:
    - name: MONGODB_HOST
      value: mongodb
    ports:
    - containerPort: 5000
      name: web-port
```

RSVP Web Service yaml

```
apiVersion: v1
kind: Service
metadata:
  name: rsvp
  labels:
    app: rsvp
spec:
  type: NodePort
  ports:
  - port: 80
    targetPort: web-port
    protocol: TCP
    nodePort: 31200
  selector:
    app: rsvp
```

서곧디 (서비스 이름이 곧 디엔에스)

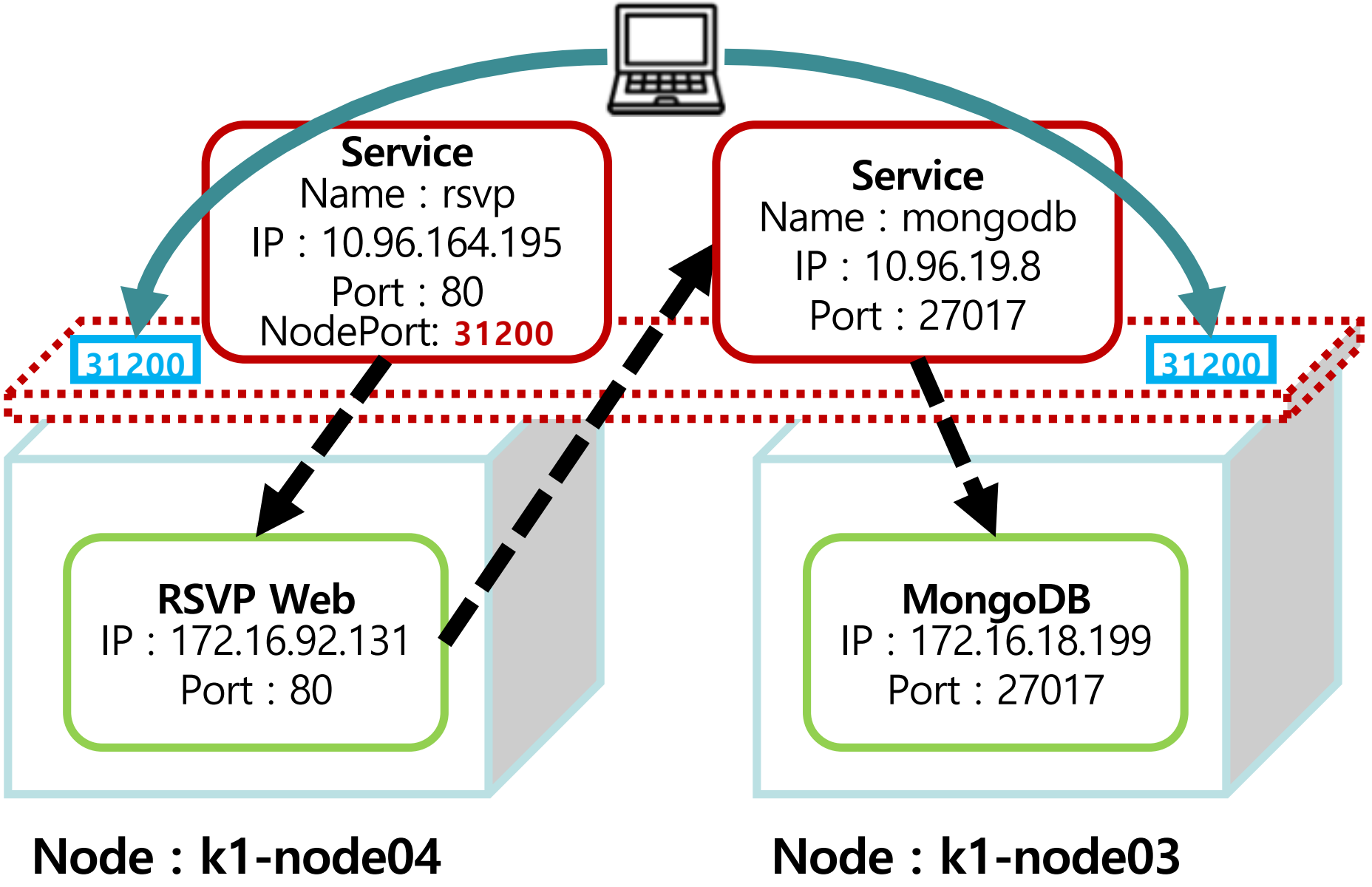
컨테이너 Port

Host 서버에 오픈 되는 Port

RSVP Web Artifact

```
root@k1-master01:rsvpapp# kubectl get pods -o wide
NAME                        READY     STATUS    RESTARTS   AGE       IP               NODE
rsvp-64774bfb5-hpx2h        1/1       Running   0          1m        172.16.92.131    k1-node04
rsvp-db-56c665b6b7-95q9t    1/1       Running   0          1h        172.16.28.199    k1-node03
root@k1-master01:rsvpapp# kubectl get svc -o wide
NAME         TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)          AGE       SELECTOR
kubernetes   ClusterIP   10.96.0.1       <none>        443/TCP          1d        <none>
mongodb      ClusterIP   10.96.19.8      <none>        27017/TCP        1h        appdb=rsvpdb
rsvp         NodePort    10.96.164.195   <none>        80:31200/TCP     1m        app=rsvp
```

그럼 어떻게 구성된 거지?

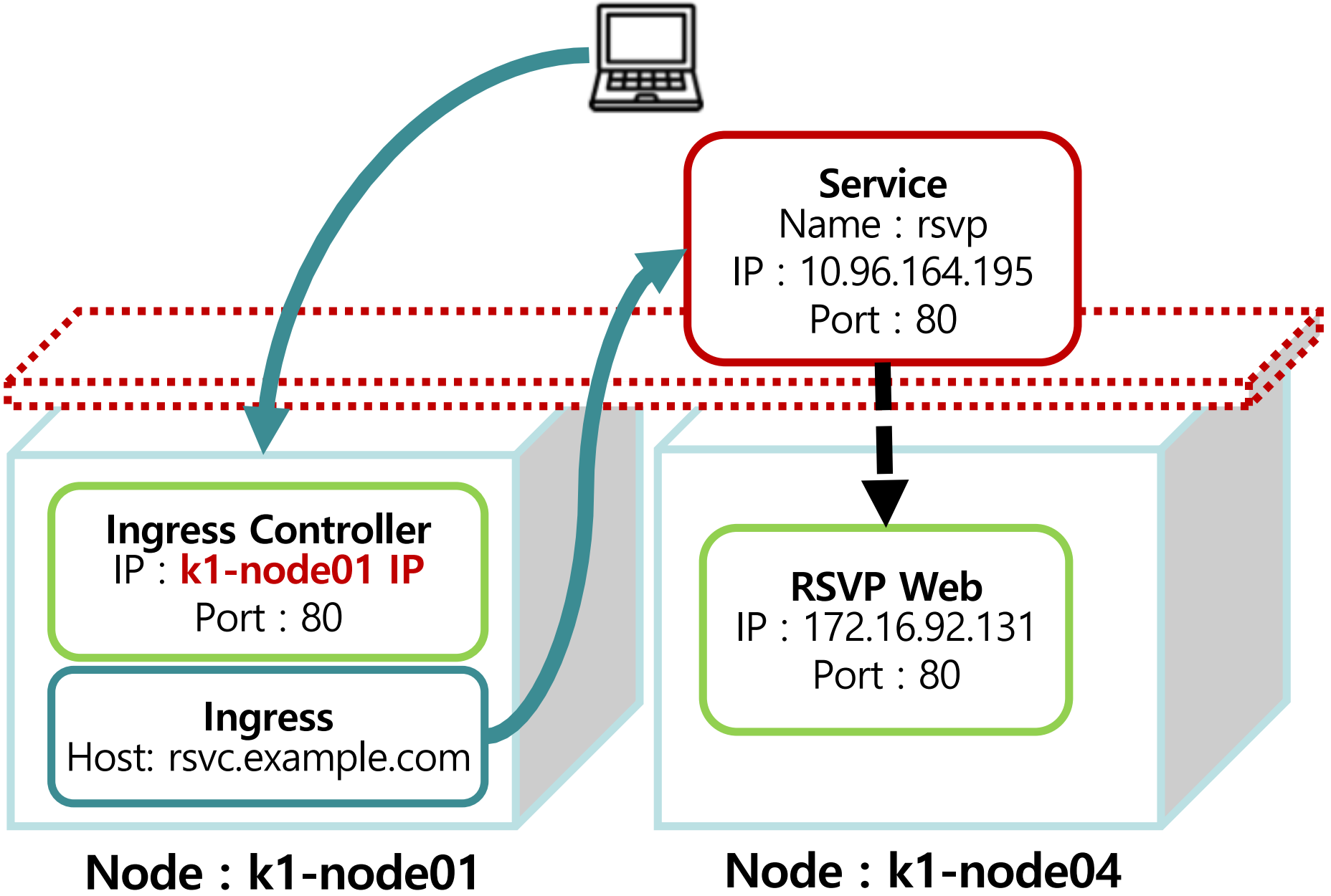

Service
Name : rsvp
IP : 10.96.164.195
Port : 80
NodePort: 31200
Service
Name : mongodb
IP : 10.96.19.8
Port : 27017
31200
31200
RSVP Web
IP : 172.16.92.131
Port : 80
MongoDB
IP : 172.16.18.199
Port : 27017
Node : k1-node04
Node : k1-node03

RSVP Web 접속 (host port 로 접속)

난 도메인으로 접속하고 싶은데 – Ingress Controller 는 어디에?

```
root@k1-master01:rsvpapp# kubectl get pod -n ingress-nginx -o wide
NAME                                    READY     STATUS    RESTARTS   AGE       IP              NODE
default-http-backend-v1.4-jx84q         1/1       Running   0          4m        172.16.92.132   k1-node04
nginx-ingress-controller-fnfmk          1/1       Running   0          4m        192.168.30.12   k1-node01
```

난 도메인으로 접속하고 싶은데 – Ingress 로 접속



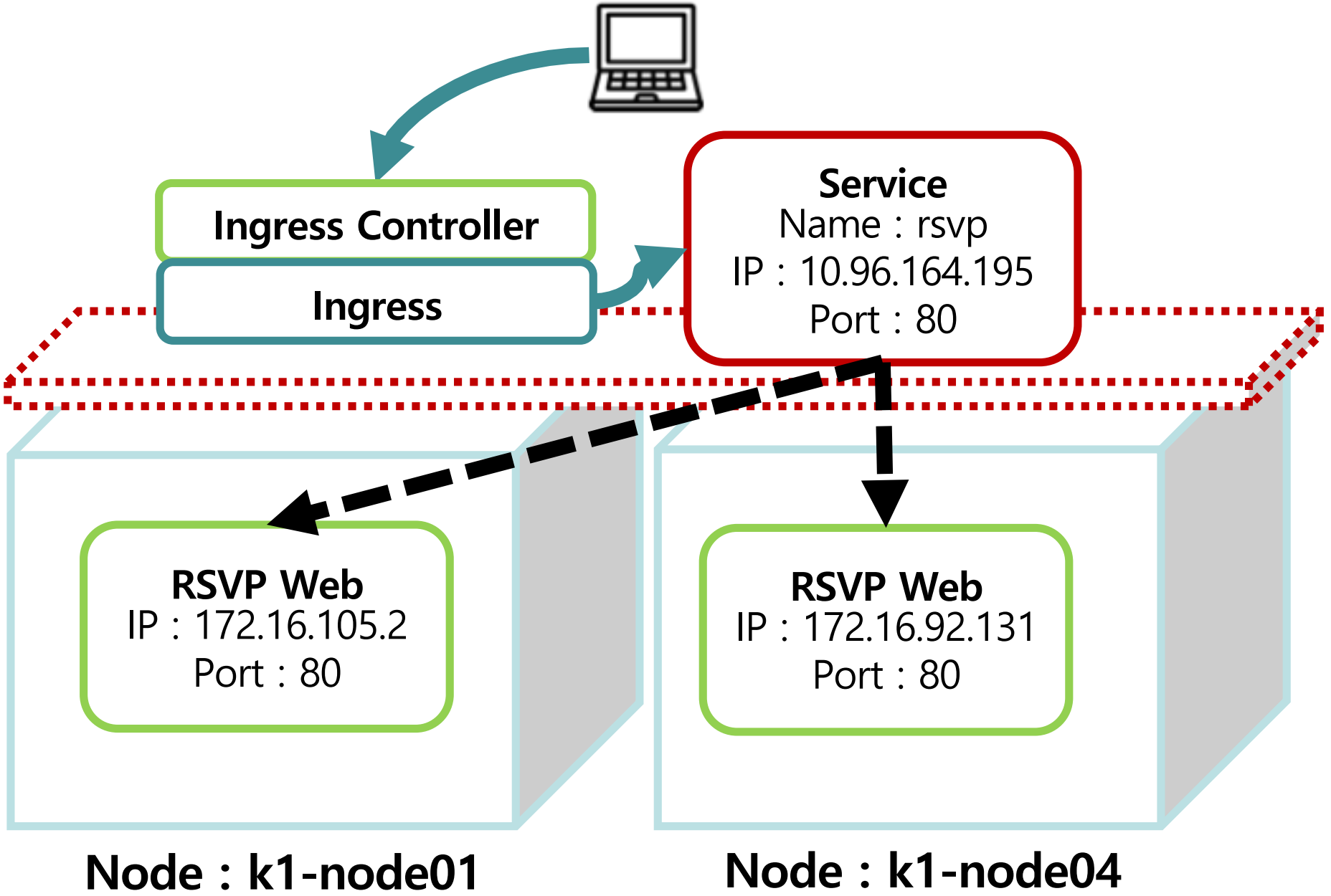
RSVP Web 접속 (도메인으로 접속)

인스턴스를 늘리기 싶다. - Scale out

$ kubectl scale deployments/rsvp --replicas=2

```
root@k1-master01:rsvpapp# kubectl get pods -o wide
NAME                      READY     STATUS    RESTARTS   AGE       IP              NODE
rsvp-64774bfb5-hpx2h      1/1       Running   0          21h       172.16.92.131   k1-node04
rsvp-db-56c665b6b7-95q9t  1/1       Running   0          22h       172.16.28.199   k1-node03
root@k1-master01:rsvpapp# kubectl get deployment -o wide
NAME      DESIRED   CURRENT   UP-TO-DATE   AVAILABLE   AGE       CONTAINERS   IMAGES                   SELECTOR
rsvp      1         1         1            1           21h       rsvp-app     teamcloudyuga/rsvpapp    app=rsvp
rsvp-db   1         1         1            1           22h       rsvp-db      mongo:3.3                appdb=rsvpdb
root@k1-master01:rsvpapp# kubectl scale deployments/rsvp --replicas=2
deployment.extensions "rsvp" scaled
root@k1-master01:rsvpapp# kubectl get pods -o wide
NAME                      READY     STATUS    RESTARTS   AGE       IP              NODE
rsvp-64774bfb5-hpx2h      1/1       Running   0          21h       172.16.92.131   k1-node04
rsvp-64774bfb5-jhs2d      1/1       Running   0          10s       172.16.105.2    k1-node01
rsvp-db-56c665b6b7-95q9t  1/1       Running   0          22h       172.16.28.199   k1-node03
```

Scale out 후 접속



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Q&A