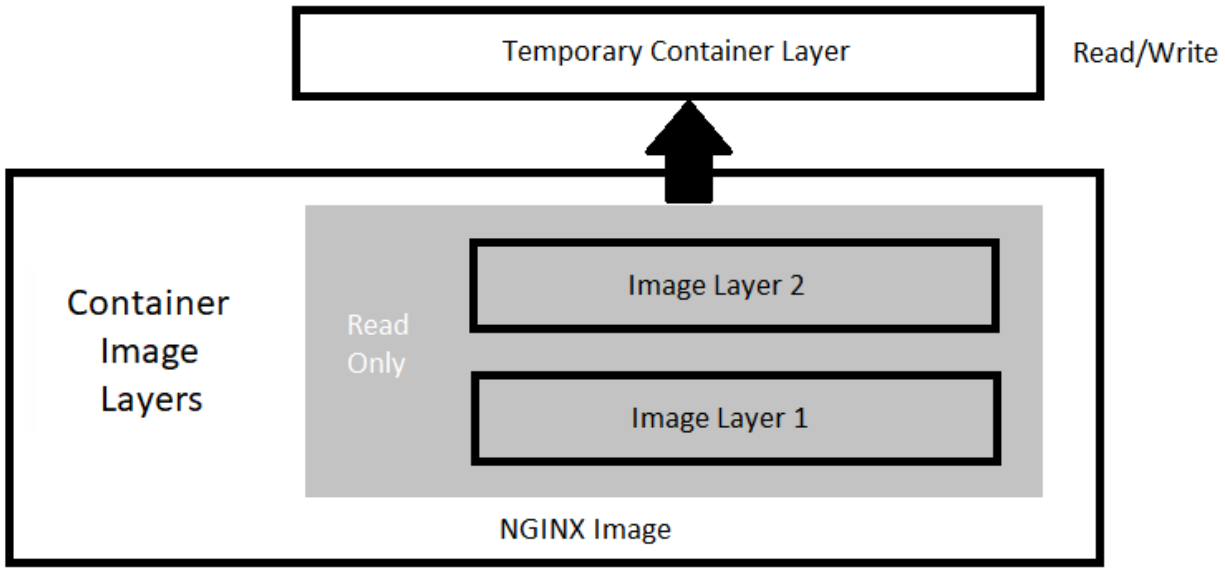
Chapter 1: Understanding Docker and Containers Essentials



Platform	X86_64	ARM	ARM64/AARCH64
Docker Desktop Windows	✓		
Docker Desktop MacOS	✓		
CentOS	✓		✓
Debian	✓	✓	✓
Fedora	✓		✓
Ubuntu	✓	✓	✓

```
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
1b930d010525: Pull complete
Digest: sha256:fc6a51919cfeb2e6763f62b6d9e8815acbf7cd2e476ea353743570610737b752
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
 $ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
 https://hub.docker.com/

For more examples and ideas, visit:
 https://docs.docker.com/get-started/
```

```
23:58:39.23
23:58:39.23 Welcome to the Bitnami nginx container
23:58:39.23 Subscribe to project updates by watching https://github.com/bitnami/bitnami-docker-nginx
23:58:39.23 Submit issues and feature requests at https://github.com/bitnami/bitnami-docker-nginx/issues
23:58:39.23 Send us your feedback at containers@bitnami.com
23:58:39.24
23:58:39.24 INFO  ==> ** Starting NGINX setup **
23:58:39.25 INFO  ==> Validating settings in NGINX_* env vars...
23:58:39.25 INFO  ==> Initializing NGINX...

23:58:39.26 INFO  ==> ** NGINX setup finished! **
23:58:39.27 INFO  ==> ** Starting NGINX **
```

```
[root@localhost ~]# docker run -d bitnami/nginx:latest
5283811f91f02ecc2d0adf5ed74ea001b5136b6991e4ff815ee03a0691a05735
```

```
CONTAINER ID    IMAGE
5283811f91f0    bitnami/nginx:latest
```

```
NAMES
silly_keldysh
```

```
CONTAINER ID    IMAGE                  COMMAND                  CREATED
72212346d765    nginx                  "nginx -g 'daemon of…"   6 seconds ago
7967c50b260f    rancher/rancher:latest "entrypoint.sh"          3 days ago
```

```
IMAGE          COMMAND                  CREATED             STATUS
nginx          "nginx -g 'daemon of…"   10 minutes ago      Up 10 minutes
nginx          "nginx -g 'daemon of…"   12 minutes ago      Exited (0) 10 minutes ago
```

```
CONTAINER ID       IMAGE                COMMAND                  CREATED             STATUS
bbadb2bddaab       bitnami/nginx:latest "/entrypoint.sh /run…"   9 seconds ago       Up 7 seconds
```

```
root@Blade:~# docker attach bbadb2bddaab
```

```
root@Blade:~# docker attach bbadb2bddaab
172.18.0.1 - - [04/Mar/2020:18:50:42 +0000] "GET / HTTP/1.1" 200 612 "-" "curl/7.58.0"
172.18.0.1 - - [04/Mar/2020:18:50:43 +0000] "GET / HTTP/1.1" 200 612 "-" "curl/7.58.0"
172.18.0.1 - - [04/Mar/2020:18:50:44 +0000] "GET / HTTP/1.1" 200 612 "-" "curl/7.58.0"
172.18.0.1 - - [04/Mar/2020:18:50:45 +0000] "GET / HTTP/1.1" 200 612 "-" "curl/7.58.0"
```

```
root@Blade:~# docker ps
CONTAINER ID        IMAGE        COMMAND         CREATED          STATUS          PORTS           NAMES
root@Blade:~#
```

```
root@Blade:~# docker exec -it nginx-test bash
I have no name!@0a7c916e7411:/app$
```

```
root@Blade:~# docker exec -it nginx-test bash
I have no name!@0a7c916e7411:/app$ exit
exit
root@Blade:~# docker ps
CONTAINER ID        IMAGE                 COMMAND                  CREATED             STATUS
0a7c916e7411        bitnami/nginx:latest  "/entrypoint.sh /run…"   12 minutes ago      Up 12 minutes
root@Blade:~#
```

```
Conflict. The container name "/nginx-test" is already in use
```

Chapter 2: Working with Docker Data

```
01a33357ddacce87762e4e84bafac11240b3c1ea9280e308891d059c65fa2c0c
59cad006b82cf2d51e8313bff7b0cb971d098b71eb32ca47360bcdbb76268b79
8e8c2cd1771d6299d90ed666bb781ed01403e11a1d3972482178a11089a0ada6
a3d8b42a5bdb615b81aef2cc294c88bfa46d737139a475a5acbd32f66d8ab67a
c14c408cdae19757e985c6a4e0d6f6cbaf212e281891209c136cbd845867df79
da5eab82d7d424f2a3af1fdd43d9f6edea3ff5b3f690f5c748f7eeccd67650a7
e0f5c8cb418296b820de1594a2bee3fcdbe2aa36c4dc0d201133337b45650b2f
```

```
[root@localhost docker]# docker volume create
bcbec7f0a0c6390a149f49dfae610cabdd2e8e670f9f6ba221fc6910865ee150
```

```
[root@localhost docker]# docker volume create pv-mysql-data
pv-mysql-data
```

```
[root@localhost docker]# ls volumes/pv-mysql-data/_data/
 auto.cnf         binlog.000002   ca-key.pem   client-cert.pem   ib_buffer_pool   ib_logfile0
 binlog.000001    binlog.index    ca.pem       client-key.pem    ibdata1          ib_logfile1
```

```
[System] [MY-010116] [Server] /usr/sbin/mysqld (mysqld 8.0.19) starting as process 1
[ERROR] [MY-012574] [InnoDB] Unable to lock ./ibdata1 error: 11
[ERROR] [MY-012574] [InnoDB] Unable to lock ./ibdata1 error: 11
[ERROR] [MY-012574] [InnoDB] Unable to lock ./ibdata1 error: 11
[ERROR] [MY-012574] [InnoDB] Unable to lock ./ibdata1 error: 11
```

```
[root@localhost docker]# docker volume list
DRIVER              VOLUME NAME
local               01a33357ddacce87762e4e84bafac11240b3c1ea9280e308891d059c65fa2c0c
local               8e8c2cd1771d6299d90ed666bb781ed01403e11a1d3972482178a11089a0ada6
local               26b5842b0247bb306bafb36acc5fa5d40ae6b49677f3c8c72c85ef0a8090a884
local               59cad006b82cf2d51e8313bff7b0cb971d098b71eb32ca47360bcdbb76268b79
local               74c99b1f7497e135a3e9f98f9a2a86c5f4d7344e2f1a1ff7e3408b9ba6052c56
local               99b858541e0acc3acbc6985d6d644e8681a8b55acb5c5d9fa9cd492474635 79d
local               34831338a1c81f568a5b725a07d35fbcfab6c5be1fd7fc9585c539bfb7b1c28f
local               a3d8b42a5bdb615b81aef2cc294c88bfa46d737139a475a5acbd32f66d8ab67a
local               bcbec7f0a0c6390a149f49dfae610cabdd2e8e670f9f6ba221fc6910865ee150
local               c4e1e56ec9af7e9dcdbb084ab7cb6e2f1c050078a818d24e183e99e7fe4983c9
local               c14c408cdae19757e985c6a4e0d6f6cbaf212e281891209c136cbd845867df79
local               da5eab82d7d424f2a3af1fdd43d9f6edea3ff5b3f690f5c748f7eeccd67650a7
local               e0f5c8cb418296b820de1594a2bee3fcdbe2aa36c4dc0d201133337b45650b2f
local               pv-mysql-data
```

```
[root@localhost docker]# docker volume prune
WARNING! This will remove all local volumes not used by at least one container.
Are you sure you want to continue? [y/N]
```

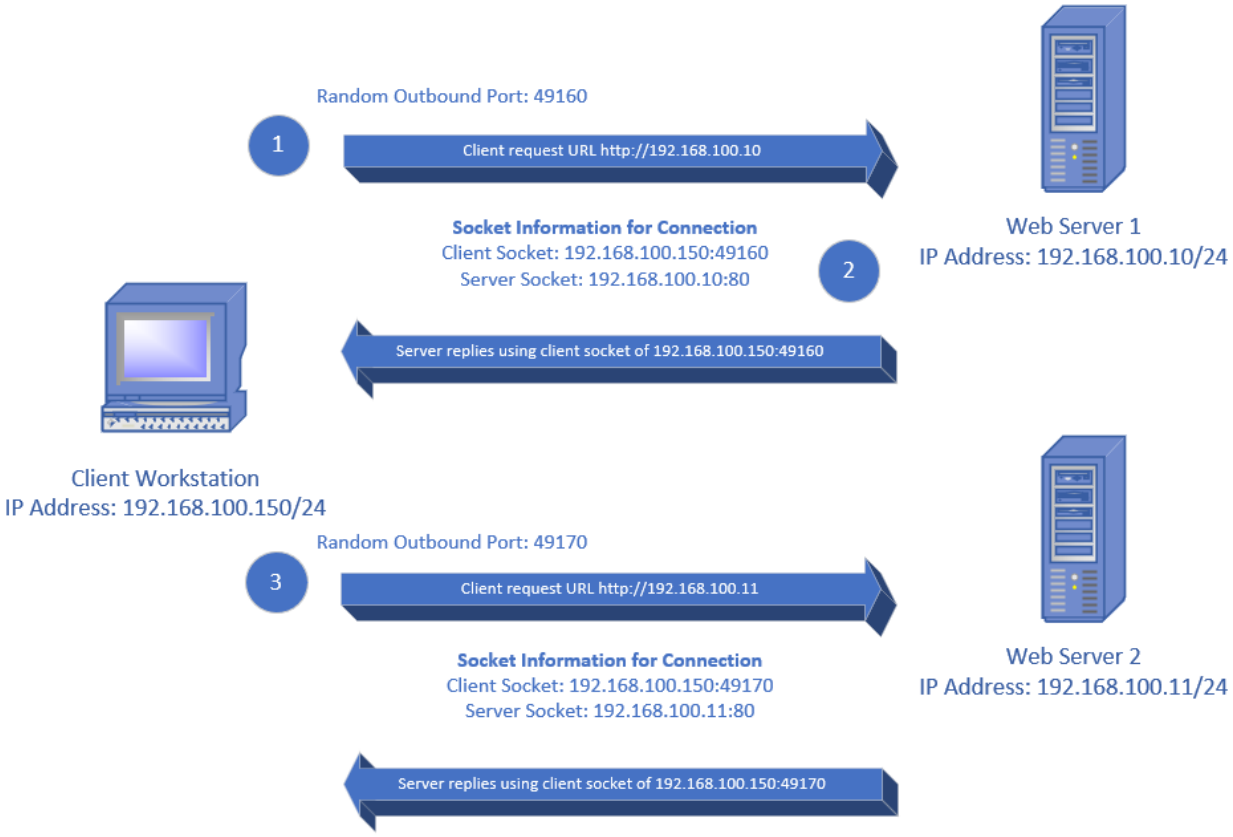
```
Deleted Volumes:
e0f5c8cb418296b820de1594a2bee3fcdbe2aa36c4dc0d201133337b45650b2f
bcbec7f0a0c6390a149f49dfae610cabdd2e8e670f9f6ba221fc6910865ee150
59cad006b82cf2d51e8313bff7b0cb971d098b71eb32ca47360bcdbb76268b79
a3d8b42a5bdb615b81aef2cc294c88bfa46d737139a475a5acbd32f66d8ab67a
74c99b1f7497e135a3e9f98f9a2a86c5f4d7344e2f1a1ff7e3408b9ba6052c56
26b5842b0247bb306bafb36acc5fa5d40ae6b49677f3c8c72c85ef0a8090a884
34831338a1c81f568a5b725a07d35fbcfab6c5be1fd7fc9585c539bfb7b1c28f

Total reclaimed space: 283.2MB
```

```
DRIVER              VOLUME NAME
root@Blade:~#
```

```
"Mounts": [
    {
        "Type": "tmpfs",
        "Target": "/opt/html",
        "TmpfsOptions": {
            "SizeBytes": 1000000,
            "Mode": 1016
        }
    }
],
```

```
root@Blade:~# docker exec nginx-test df -h
Filesystem      Size  Used Avail Use% Mounted on
overlay         251G  6.0G  233G   3% /
tmpfs            64M     0   64M   0% /dev
tmpfs            13G     0   13G   0% /sys/fs/cgroup
shm              64M     0   64M   0% /dev/shm
/dev/sdb        251G  6.0G  233G   3% /etc/hosts
tmpfs           980K     0  980K   0% /opt/html
tmpfs            13G     0   13G   0% /proc/acpi
tmpfs            13G     0   13G   0% /sys/firmware
```

Chapter 3: Understanding Docker Networking



Docker Networking Drivers

Driver Name	Description
Bridge	This is the most commonly used driver on a standalone Docker host system. It is the default driver that will be used if you do not specify another option when you start a container.
Host	If you wanted your containers to access the host network directly, you would use the host driver. This removes the need for your containers to go through a connection controlled by Docker. A container using the host network driver will not get an IP address and does not require exposing ports to allow incoming traffic.
Overlay	An overlay network is used by Docker to connect multiple Docker servers together. It provides a communication path between hosts and containers that is not dependent on the underlying network infrastructure.
Macvlan	The Macvlan is useful for an application that requires a direct connection to the network. It allows you to assign a MAC address to a container, which allows the container to bypass Docker networking. Even though it is bypassing the Docker networking stack, the Docker daemon is still used to route packets to the correct container, based on the MAC address.
None	You may need to disable the network for a container that needs to be used locally or may contain sensitive information. If you set the container network to none, it will not have **any** network access.

```
[root@localhost ~]# docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
bdf7d93f8545        bridge              bridge              local
9e17e1e628b2        host                host                local
ad0665c8c456        none                null                local
```

```
[
    {
        "Name": "backend",
        "Id": "0ea2374cc48b54daa6fc4f149d0e9db5ff5363f1d78a6be6ebde4ce5e62245de",
        "Created": "2020-03-03T18:55:09.067535801-05:00",
        "Scope": "local",
        "Driver": "bridge",
        "EnableIPv6": false,
        "IPAM": {
            "Driver": "default",
            "Options": {},
            "Config": [
                {
                    "Subnet": "192.168.10.0/24",
                    "Gateway": "192.168.10.1"
                }
            ]
        },
        "Internal": false,
        "Attachable": false,
        "Ingress": false,
        "ConfigFrom": {
            "Network": ""
        },
        "ConfigOnly": false,
        "Containers": {
            "505b3036dad4ec09f01f62d02470ba2980960f33c4e8f972d4e9fe10dd0d9591": {
                "Name": "nginx1",
                "EndpointID": "6fdd84bc9b1ef5ae76483bd02a1fe76f2da3a8b794826a0a9a5c00a93b674e29",
                "MacAddress": "02:42:c0:a8:0a:03",
                "IPv4Address": "192.168.10.3/24",
                "IPv6Address": ""
            },
            "9c72477cf304d8d0a6e8b6184a0da4f99b5b506b7f474bef2892efad45727f7d": {
                "Name": "frontend",
                "EndpointID": "a3e8286247e23a21e6c7350bcb8aef8786cd6bcc8d85f77d4e392ca08c71cdce",
                "MacAddress": "02:42:c0:a8:0a:02",
                "IPv4Address": "192.168.10.2/24",
                "IPv6Address": ""
            }
        },
        "Options": {},
        "Labels": {}
    }
```


```
[root@localhost ~]# docker network create frontend
9435231d9c251aa073ede3169728756bdae1d94fb04cd5a2e362ccd15d001343
```

```
[root@localhost ~]# docker network ls
NETWORK ID          NAME                DRIVER              SCOPE
bdf7d93f8545        bridge              bridge              local
9435231d9c25        frontend            bridge              local
9e17e1e628b2        host                host                local
ad0665c8c456        none                null                local
```

```
[root@localhost ~]# docker network create backend --subnet=192.168.10.0/24 --gateway=192.168.10.1
eac1de9dc37555d2599195670fc295e545f46cad2718434b04e402af19b66a72
```

```
inet 192.168.10.1/24 brd 192.168.10.255 scope global br-0ea2374cc48b
```

```
[root@localhost ~]# docker run --network=frontend --name nginx1 -d bitnami/nginx:latest
505b3036dad4ec09f01f62d02470ba2980960f33c4e8f972d4e9fe10dd0d9591
```

```
[root@localhost ~]# docker network connect backend nginx1
```

```
[root@localhost ~]# docker network disconnect frontend nginx1
```

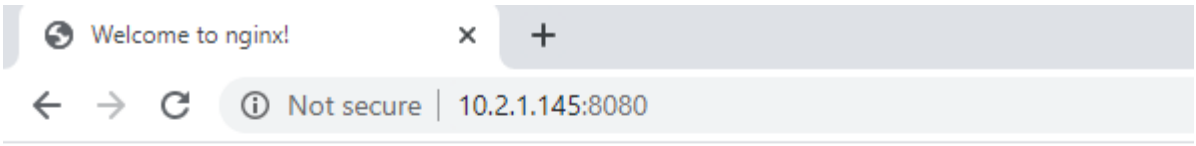
```
[root@localhost ~]# docker network rm frontend
frontend
```

```
[root@localhost ~]# docker network prune
WARNING! This will remove all networks not used by at least one container.
Are you sure you want to continue? [y/N] y
Deleted Networks:
backend4
```

```
surovich@kind:~$ sudo docker run --network=host --name nginx -d bitnami/nginx:latest
aa2f7df70ff85021f7c039e5f4f93c525738e3448c6b39e66114373d7108414e
```

```
PORTS                 NAMES
                      nginx
```

```
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:8080            0.0.0.0:*               LISTEN
```



Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

```
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0     64 10.2.1.145:ssh          10.2.1.125:33387        ESTABLISHED
```

```
surovich@kind:~$ sudo docker run -p 8080:8080 --name nginx -d bitnami/nginx:latest
6e3d098d632343bd6062f2abbcc28b67643406900a77de56bc92cbc7d5f78579
```

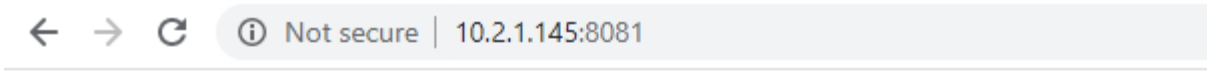
```
PORTS
0.0.0.0:8080->8080/tcp, 0.0.0.0:8443->8443/tcp
```

```
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
tcp        0     64 10.2.1.145:22           10.2.1.125:33387        ESTABLISHED
tcp6       0      0 :::8080                 :::*                    LISTEN
tcp6       0      0 :::22                   :::*                    LISTEN
tcp6       0      0 :::8443                 :::*                    LISTEN
```

```
surovich@kind:~$ sudo docker run -p 8080:8080 -p 8443:8443 --name nginx2 -d bitn
ami/nginx:latest
5262ec823d3bfa3dbabf8bafe0b5ce5e7097b97fe60d4aa3de5d225f196fdb4d
docker: Error response from daemon: driver failed programming external connectiv
ity on endpoint nginx2 (e9d5b4735153099d2761fde82397202d7d6270937b421ab4301ae5d6
0c211e3b): Bind for 0.0.0.0:8443 failed: port is already allocated.
```

```
surovich@kind:~$ sudo docker run -p 8081:8080 -p 8444:8443 --name nginx2 -d bitnami/nginx:latest
9513e1c5821e9b77d286f7522bcee3b91eb87f430b745335f639f9d8fccf8b75
```

```
surovich@kind:~$ sudo docker ps
CONTAINER ID        IMAGE                 COMMAND                  CREATED             STATUS              PORTS
                                    NAMES
9513e1c5821e        bitnami/nginx:latest   "/entrypoint.sh /run…"   2 minutes ago       Up 2 minutes        0.0.0.0
:8081->8080/tcp, 0.0.0.0:8444->8443/tcp   nginx2
32d0bb32f337        bitnami/nginx:latest   "/entrypoint.sh /run…"   About an hour ago   Up About an hour    0.0.0.0
:8080->8080/tcp, 0.0.0.0:8443->8443/tcp   nginx
```



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Thank you for using nginx.

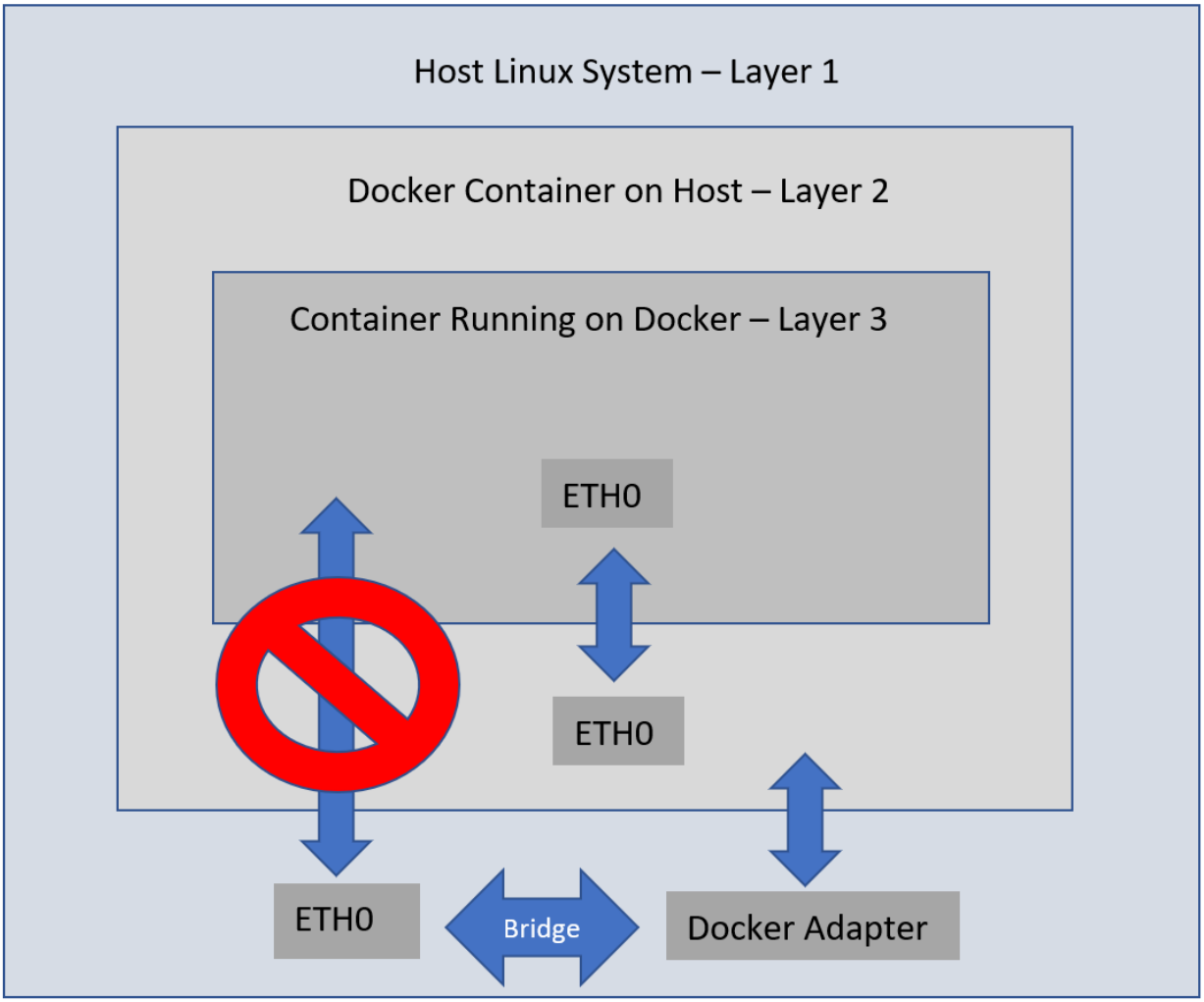
```
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
tcp        0     64 10.2.1.145:22           10.2.1.125:33387        ESTABLISHED
tcp6       0      0 :::8080                 :::*                    LISTEN
tcp6       0      0 :::8081                 :::*                    LISTEN
tcp6       0      0 :::22                   :::*                    LISTEN
tcp6       0      0 :::8443                 :::*                    LISTEN
tcp6       0      0 :::8444                 :::*                    LISTEN
udp        0      0 0.0.0.0:68              0.0.0.0:*
```

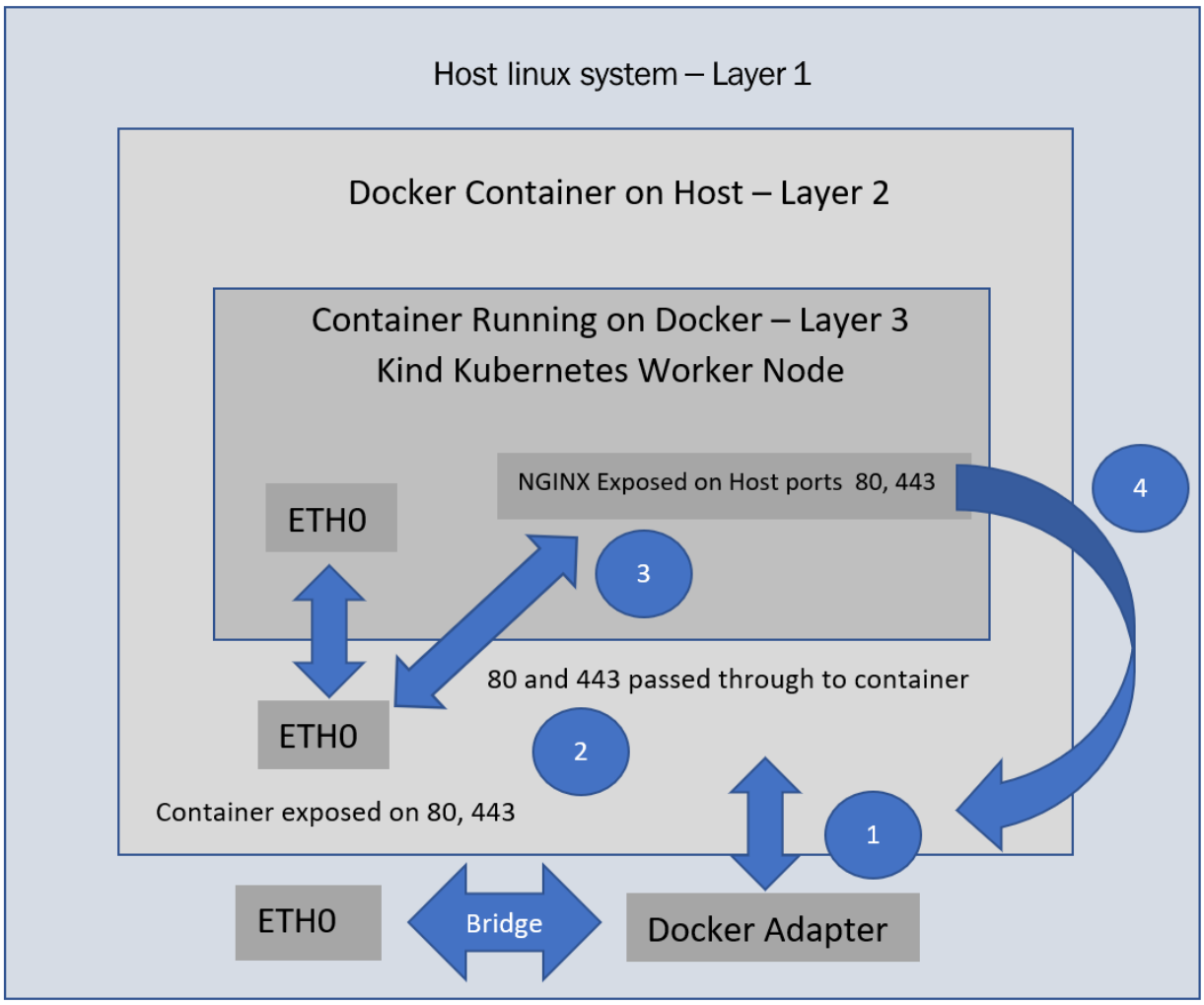
Chapter 4: Deploying Kubernetes Using KinD

```
UID          PID  PPID  C STIME TTY          TIME CMD
root           1     0  0 12:34 ?        00:00:00 /sbin/init
root          70     1  0 12:34 ?        00:00:00 /lib/systemd/systemd-journald
root          79     1  0 12:34 ?        00:00:22 /usr/local/bin/containerd
root         794     1  1 12:35 ?        00:00:55 /usr/bin/kubelet --bootstrap-kubeconfig=/etc/kube
root         845     1  0 12:35 ?        00:00:00 /usr/local/bin/containerd-shim-runc-v2 -namespace
root         866   845  0 12:35 ?        00:00:00 /pause
root         893     1  0 12:35 ?        00:00:00 /usr/local/bin/containerd-shim-runc-v2 -namespace
root         919   893  0 12:35 ?        00:00:00 /pause
root         958   845  0 12:35 ?        00:00:01 /bin/kindnetd
root        1008   893  0 12:35 ?        00:00:01 /usr/local/bin/kube-proxy --config=/var/lib/kube-
root        1076     1  0 12:35 ?        00:00:00 /usr/local/bin/containerd-shim-runc-v2 -namespace
root        1098  1076  0 12:35 ?        00:00:00 /pause
root        1124     1  0 12:35 ?        00:00:00 /usr/local/bin/containerd-shim-runc-v2 -namespace
root        1149  1124  0 12:35 ?        00:00:00 /pause
root        1170     1  0 12:35 ?        00:00:00 /usr/local/bin/containerd-shim-runc-v2 -namespace
root        1191  1170  0 12:35 ?        00:00:00 /pause
root        1216     1  0 12:35 ?        00:00:00 /usr/local/bin/containerd-shim-runc-v2 -namespace
root        1240  1216  0 12:35 ?        00:00:00 /pause
root        1271  1076  0 12:35 ?        00:00:13 kube-scheduler --authentication-kubeconfig=/etc/
root        1328  1124  3 12:35 ?        00:02:05 kube-apiserver --advertise-address=172.17.0.6 --
root        1366  1170  0 12:35 ?        00:00:06 kube-controller-manager --allocate-node-cidrs=tru
root        1425  1216  3 12:35 ?        00:02:00 etcd --advertise-client-urls=https://172.17.0.6:
```

```
UID          PID  PPID  C STIME TTY          TIME CMD
root           1     0  0 12:34 ?        00:00:00 /sbin/init
root          72     1  0 12:34 ?        00:00:00 /lib/systemd/systemd-journald
root          79     1  0 12:34 ?        00:00:13 /usr/local/bin/containerd
root        1291     1  0 12:36 ?        00:00:35 /usr/bin/kubelet --bootstrap-kubeconfig=/etc/kube
root        1343     1  0 12:37 ?        00:00:00 /usr/local/bin/containerd-shim-runc-v2 -namespace
root        1373     1  0 12:37 ?        00:00:00 /usr/local/bin/containerd-shim-runc-v2 -namespace
root        1397  1343  0 12:37 ?        00:00:00 /pause
root        1404  1373  0 12:37 ?        00:00:00 /pause
root        1461  1373  0 12:37 ?        00:00:01 /bin/kindnetd
root        1467  1343  0 12:37 ?        00:00:01 /usr/local/bin/kube-proxy --config=/var/lib/kube-
root        3508     0  0 13:38 pts/1    00:00:00 bash
root        3516  3508  0 13:38 pts/1    00:00:00 ps -ef
```

```
NAMESPACE            NAME                                         READY   STATUS    RESTARTS   AGE
kube-system          coredns-6955765f44-425sl                     1/1     Running   0          68m
kube-system          coredns-6955765f44-sclfh                     1/1     Running   0          68m
kube-system          etcd-config2-control-plane                   1/1     Running   0          68m
kube-system          etcd-config2-control-plane2                  1/1     Running   0          68m
kube-system          etcd-config2-control-plane3                  1/1     Running   0          67m
kube-system          kindnet-4lzz5                                1/1     Running   0          68m
kube-system          kindnet-blcwt                                1/1     Running   0          68m
kube-system          kindnet-bp6jj                                1/1     Running   0          66m
kube-system          kindnet-p2jw8                                1/1     Running   0          67m
kube-system          kindnet-pl2gg                                1/1     Running   0          66m
kube-system          kindnet-vfcpm                                1/1     Running   0          66m
kube-system          kube-apiserver-config2-control-plane         1/1     Running   0          68m
kube-system          kube-apiserver-config2-control-plane2        1/1     Running   0          68m
kube-system          kube-apiserver-config2-control-plane3        1/1     Running   1          67m
kube-system          kube-controller-manager-config2-control-plane   1/1     Running   1          68m
kube-system          kube-controller-manager-config2-control-plane2  1/1     Running   0          68m
kube-system          kube-controller-manager-config2-control-plane3  1/1     Running   0          66m
kube-system          kube-proxy-c77z6                             1/1     Running   0          66m
kube-system          kube-proxy-fvvbb                             1/1     Running   0          68m
kube-system          kube-proxy-llfpl                             1/1     Running   0          66m
kube-system          kube-proxy-lpfnw                             1/1     Running   0          68m
kube-system          kube-proxy-pfk46                             1/1     Running   0          67m
kube-system          kube-proxy-rd26p                             1/1     Running   0          66m
kube-system          kube-scheduler-config2-control-plane         1/1     Running   1          68m
kube-system          kube-scheduler-config2-control-plane2        1/1     Running   0          68m
kube-system          kube-scheduler-config2-control-plane3        1/1     Running   0          66m
local-path-storage   local-path-provisioner-7745554f7f-g5mj8      1/1     Running   1          68m
```


Host Linux System – Layer 1
Docker Container on Host – Layer 2
Container Running on Docker – Layer 3
ETH0
ETH0
ETH0
Bridge
Docker Adapter




```
Creating cluster "cluster01" ...
 ✓ Ensuring node image (kindest/node:v1.17.0)
 ✓ Preparing nodes
 ✓ Writing configuration
 ✓ Starting control-plane
 ✓ Installing StorageClass
 ✓ Joining worker nodes
Set kubectl context to "kind-cluster01"
You can now use your cluster with:

kubectl cluster-info --context kind-cluster01

Not sure what to do next?  Check out https://kind.sigs.k8s.io/docs/user/quick-start/
```

```
configmap/calico-config created
customresourcedefinition.apiextensions.k8s.io/felixconfigurations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/ipamblocks.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/blockaffinities.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/ipamhandles.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/ipamconfigs.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/bgppeers.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/bgpconfigurations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/ippools.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/hostendpoints.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/clusterinformations.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/globalnetworkpolicies.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/globalnetworksets.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/networkpolicies.crd.projectcalico.org created
customresourcedefinition.apiextensions.k8s.io/networksets.crd.projectcalico.org created
clusterrole.rbac.authorization.k8s.io/calico-kube-controllers created
clusterrolebinding.rbac.authorization.k8s.io/calico-kube-controllers created
clusterrole.rbac.authorization.k8s.io/calico-node created
clusterrolebinding.rbac.authorization.k8s.io/calico-node created
daemonset.apps/calico-node created
serviceaccount/calico-node created
deployment.apps/calico-kube-controllers created
serviceaccount/calico-kube-controllers created
```

```
namespace/ingress-nginx created
configmap/nginx-configuration created
configmap/tcp-services created
configmap/udp-services created
serviceaccount/nginx-ingress-serviceaccount created
clusterrole.rbac.authorization.k8s.io/nginx-ingress-clusterrole created
role.rbac.authorization.k8s.io/nginx-ingress-role created
rolebinding.rbac.authorization.k8s.io/nginx-ingress-role-nisa-binding created
clusterrolebinding.rbac.authorization.k8s.io/nginx-ingress-clusterrole-nisa-binding created
deployment.apps/nginx-ingress-controller created
limitrange/ingress-nginx created
```

```
[root@localhost yaml]# kubectl describe csinodes cluster01-worker
Name:         cluster01-worker
Namespace:
Labels:       <none>
Annotations:  <none>
API Version:  storage.k8s.io/v1
Kind:         CSINode
Metadata:
  Creation Timestamp:  2020-03-27T15:19:01Z
  Owner References:
    API Version:     v1
    Kind:            Node
    Name:            cluster01-worker
    UID:             85af82eb-0b55-45f7-8b18-12ed20ca9b40
  Resource Version:  480
  Self Link:         /apis/storage.k8s.io/v1/csinodes/cluster01-worker
  UID:               05ebab79-89e5-44d9-b04d-b80a70741002
Spec:
  Drivers:  <nil>
Events:     <none>
```

```
Name:         home-k8s-master3.k8shome.com
Namespace:
Labels:       <none>
Annotations:  <none>
API Version:  storage.k8s.io/v1beta1
Kind:         CSINode
Metadata:
  Creation Timestamp:  2019-10-29T12:38:05Z
  Owner References:
    API Version:     v1
    Kind:            Node
    Name:            home-k8s-master3.k8shome.com
    UID:             c7131855-e465-49e7-a700-debfcccc2ef2
  Resource Version:  28926386
  Self Link:         /apis/storage.k8s.io/v1beta1/csinodes/home-k8s-master3.k8shome.com
  UID:               7487170e-d069-4b59-9589-8f12c9f6a98a
Spec:
  Drivers:
    Name:           csi.trident.netapp.io
    Node ID:        home-k8s-master3.k8shome.com
    Topology Keys:  <nil>
    Name:           reduxio.magellan
    Node ID:        home-k8s-master3.k8shome.com
    Topology Keys:  <nil>
Events:             <none>
```

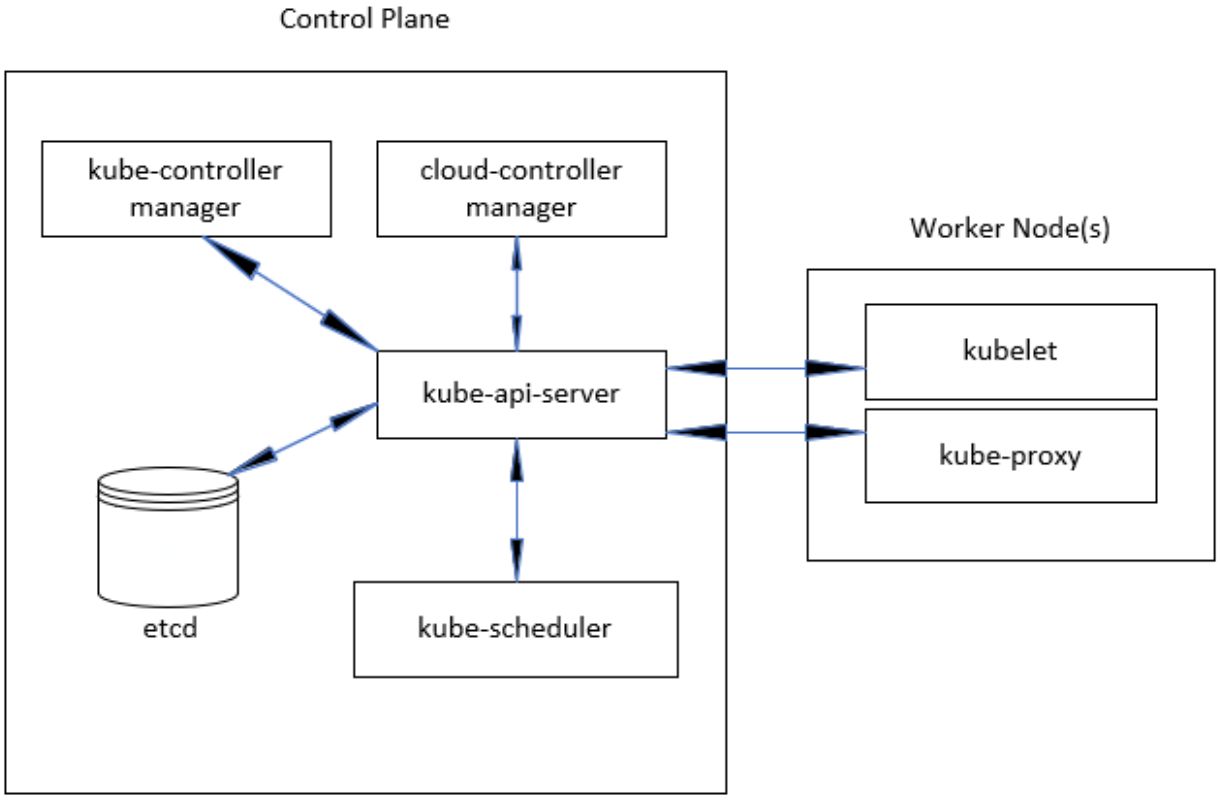
```
NAME                 PROVISIONER             RECLAIMPOLICY   VOLUMEBINDINGMODE      ALLOWVOLUMEEXPANSION   AGE
standard (default)   rancher.io/local-path   Delete          WaitForFirstConsumer   false                  66m
```

```
[root@localhost yaml]# kubectl get pv
No resources found in default namespace.
[root@localhost yaml]# kubectl get pvc --all-namespaces
No resources found
```

```
IMAGE                                  PORTS                                       NAMES
haproxy                                0.0.0.0:80->80/tcp, 0.0.0.0:443->443/tcp    haproxy-workers-lb
kindest/haproxy:2.1.1-alpine           0.0.0.0:32776->6443/tcp                     cluster01-external-load-balance

kindest/node:v1.17.0                                                               cluster01-worker
kindest/node:v1.17.0                   127.0.0.1:32801->6443/tcp                   cluster01-control-plane
kindest/node:v1.17.0                   127.0.0.1:32799->6443/tcp                   cluster01-control-plane3
kindest/node:v1.17.0                                                               cluster01-worker2
kindest/node:v1.17.0                   127.0.0.1:32800->6443/tcp                   cluster01-control-plane2
kindest/node:v1.17.0                                                               cluster01-worker3
```

```
NAME                     STATUS     ROLES    AGE   VERSION
cluster01-control-plane  Ready      master   45m   v1.17.0
cluster01-control-plane2 Ready      master   45m   v1.17.0
cluster01-control-plane3 Ready      master   43m   v1.17.0
cluster01-worker         Ready      <none>   43m   v1.17.0
cluster01-worker2        NotReady   <none>   43m   v1.17.0
cluster01-worker3        Ready      <none>   43m   v1.17.0
```

Chapter 5: Kubernetes Bootcamp




```
NAME                           STATUS   ROLES                          AGE    VERSION
home-k8s-master1.k8shome.com   Ready    controlplane,etcd,master       194d   v1.16.3
home-k8s-master2.k8shome.com   Ready    controlplane,etcd,master       194d   v1.16.3
home-k8s-master3.k8shome.com   Ready    controlplane,etcd,master,worker   194d   v1.16.3
home-k8s-worker1.k8shome.com   Ready    worker                         194d   v1.16.3
home-k8s-worker2.k8shome.com   Ready    worker                         194d   v1.16.3
home-k8s-worker3.k8shome.com   Ready    worker                         194d   v1.16.3
```

```
/registry/clusterrolebindings/cluster-admin
k8s
2
rbac.authorization.k8s.io/v1ClusterRoleBinding
cluster-admin"*$96d9796d-528d-417f-9117-a47b0bb219542z,
rbac-defaultsb3otstrapping
+rbac.authorization.kubernetes.io/autoupdatetruez4
Grouprbac.authorization.k8s.iosystem:masters"7
rbac.authorization.k8s.io
cluster-admin"            ClusterRole
```

```
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRoleBinding
metadata:
  annotations:
    rbac.authorization.kubernetes.io/autoupdate: "true"
  creationTimestamp: "2020-03-22T18:50:48Z"
  labels:
    kubernetes.io/bootstrapping: rbac-defaults
  name: cluster-admin
  resourceVersion: "95"
  selfLink: /apis/rbac.authorization.k8s.io/v1/clusterrolebindings/cluster-admin
  uid: 96d9796d-528d-417f-9117-a47b0bb21954
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: ClusterRole
  name: cluster-admin
subjects:
- apiGroup: rbac.authorization.k8s.io
  kind: Group
  name: system:masters
```

Verbosity	Description
`--v=0`	Generally useful for this to *always* be visible to a cluster operator.
`--v=1`	A reasonable default log level if you don't want verbosity.
`--v=2`	Useful steady state information about the service and important log messages that may correlate to significant changes in the system. This is the recommended default log level for most systems.
`--v=3`	Extended information about changes.
`--v=4`	Debug level verbosity.
`--v=6`	Display requested resources.
`--v=7`	Display HTTP request headers.
`--v=8`	Display HTTP request contents.
`--v=9`	Display HTTP request contents without truncation of contents.

NAME	SHORTNAMES	APIGROUP	NAMESPACED
configmaps	cm		TRUE
endpoints	ep		TRUE
events	ev		TRUE
namespaces	ns		FALSE
nodes	no		FALSE
persistentvolumeclaims	pvc		TRUE
persistentvolumes	pv		FALSE
pods	po		TRUE
replicationcontrollers	rc		TRUE
resourcequotas	quota		TRUE
secrets			TRUE
serviceaccounts	sa		TRUE
services	svc		TRUE
customresourcedefinitions	crd,crds	apiextensions.k8s.io	FALSE
daemonsets	ds	apps	TRUE
deployments	deploy	apps	TRUE
replicasets	rs	apps	TRUE
statefulsets	sts	apps	TRUE
horizontalpodautoscalers	hpa	autoscaling	TRUE
cronjobs	cj	batch	TRUE
jobs	batch		TRUE
events	ev	events.k8s.io	TRUE
ingresses	ing	extensions	TRUE
ingresses	ing	networking.k8s.io	TRUE
networkpolicies	netpol	networking.k8s.io	TRUE
podsecuritypolicies	psp	policy	FALSE
clusterrolebindings		rbac.authorization.k8s.io	FALSE
clusterroles		rbac.authorization.k8s.io	FALSE
rolebindings		rbac.authorization.k8s.io	TRUE
roles		rbac.authorization.k8s.io	TRUE
csidrivers		storage.k8s.io	FALSE
csinodes		storage.k8s.io	FALSE
storageclasses	sc	storage.k8s.io	FALSE

```
apiVersion: v1
data:
  config1: |
    Value for Config1
    We have multiple lines to show that a value isnt limited to a single entry
    A config key can have a large amount of data in each key
  config2: |
    Config2 Example
  config3: |
    and last - Config3
kind: ConfigMap
```

```
NAME                                     READY   STATUS    RESTARTS   AGE
coredns-6955765f44-brxbz                 1/1     Running   0          23h
coredns-6955765f44-zmkqk                 1/1     Running   0          23h
etcd-kind-control-plane                  1/1     Running   0          23h
kindnet-7q8gm                            1/1     Running   0          23h
kube-apiserver-kind-control-plane        1/1     Running   0          23h
kube-controller-manager-kind-control-plane   1/1     Running   0          23h
kube-proxy-vvjzx                         1/1     Running   0          23h
kube-scheduler-kind-control-plane        1/1     Running   0          23h
```

```
apiVersion: apps/v1
kind: StatefulSet
metadata:
  name: web
spec:
  selector:
    matchLabels:
      app: nginx
  serviceName: "nginx"
  replicas: 3 ------------------------------------ Create Three Pods
  template:
    metadata:
      labels:
        app: nginx
    spec:
      terminationGracePeriodSeconds: 10
      containers:
      - name: nginx ---------------------------- Name that will be used for the pods
        image: k8s.gcr.io/nginx-slim:0.8
        ports:
        - containerPort: 80
          name: web
        volumeMounts: ---------------------------- Mount PVC at /usr/share/nginx/html
        - name: www
          mountPath: /usr/share/nginx/html
  volumeClaimTemplates: ------------------------------------
  - metadata:
      name: www
    spec:
      accessModes: [ "ReadWriteOnce" ]
      storageClassName: nfs ---------------------- PVC Creation - Using the storage class named nfs
      resources:
        requests:
          storage: 1Gi
```

Chapter 6: Services, Load Balancing, and External DNS

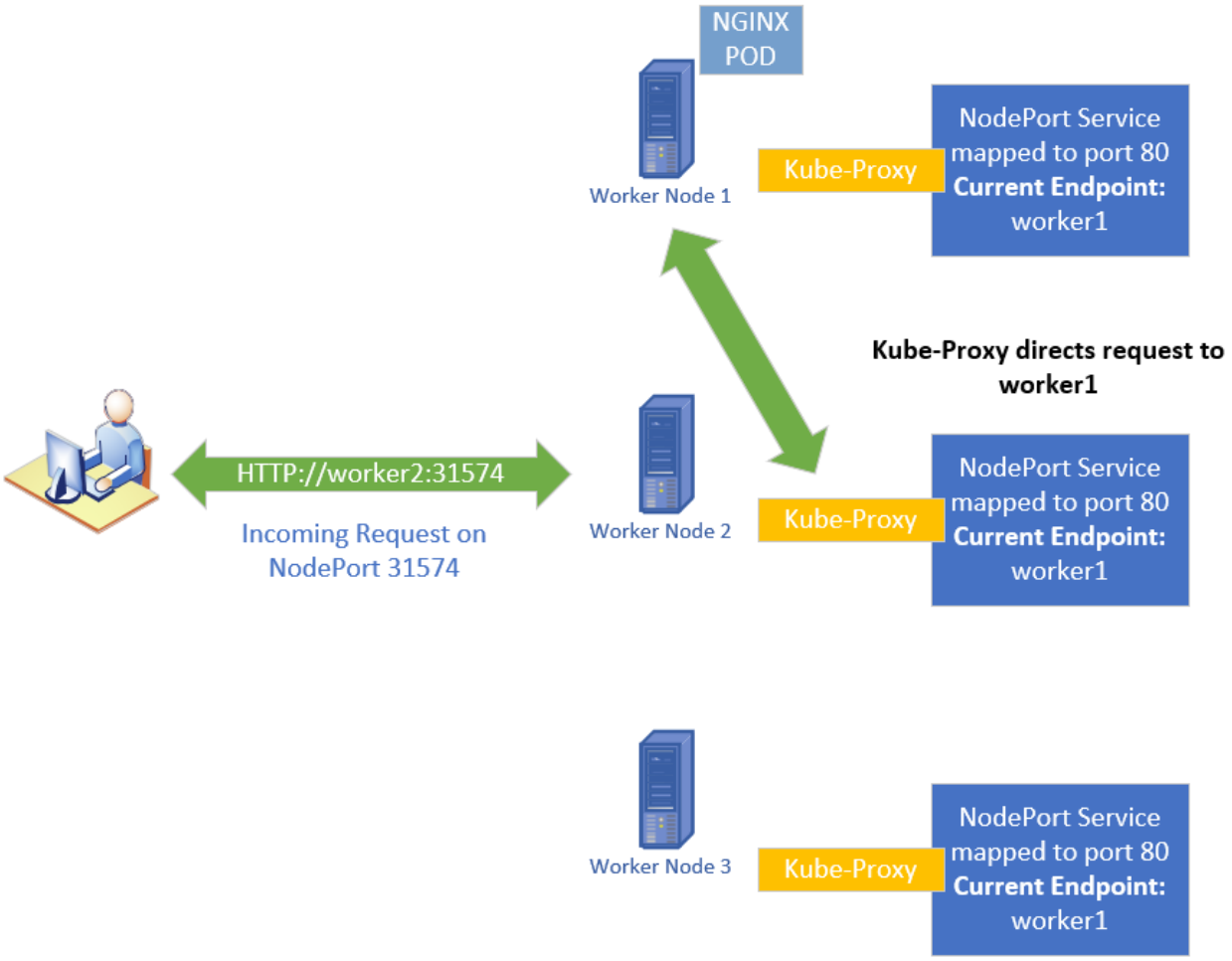
10.240.100.151:31574

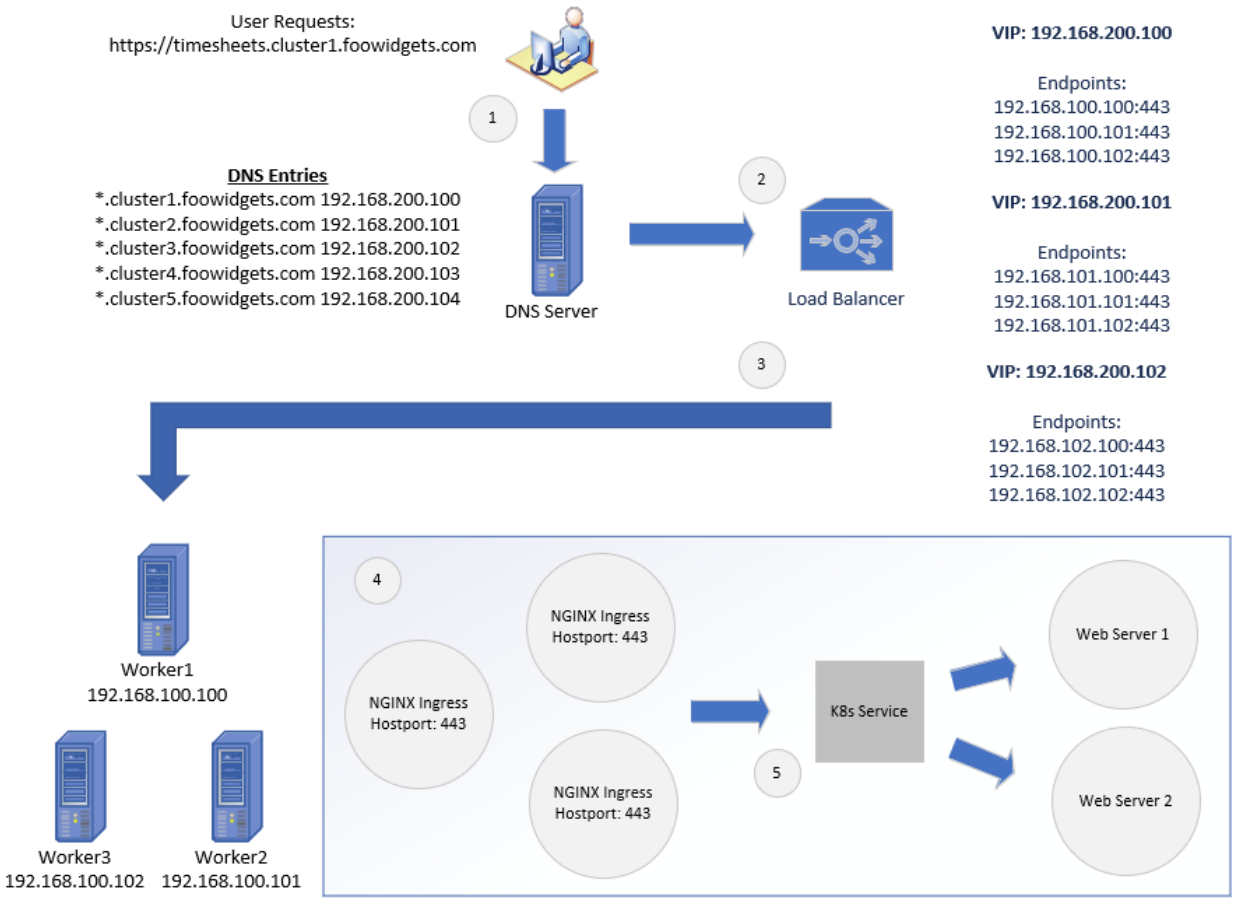
Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

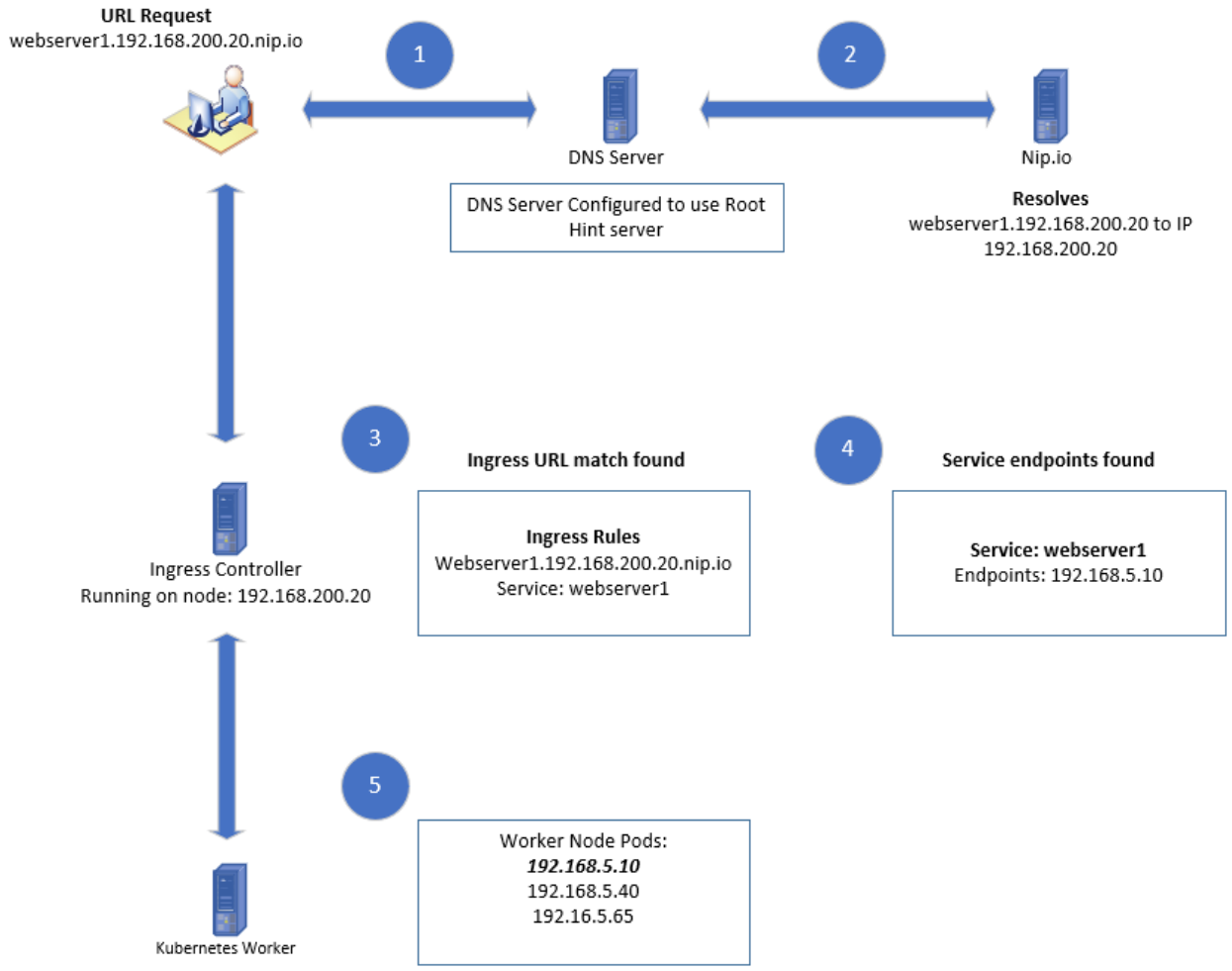
For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.






```
[root@localhost /]# ping webserver1.192.168.100.100.nip.io
PING webserver1.192.168.100.100.nip.io (192.168.100.100) 56(84) bytes of data.
[root@localhost /]# ping webserver2.192.168.100.100.nip.io
PING webserver2.192.168.100.100.nip.io (192.168.100.100) 56(84) bytes of data.
[root@localhost /]# ping webserver3.192.168.100.100.nip.io
PING webserver3.192.168.100.100.nip.io (192.168.100.100) 56(84) bytes of data.
[root@localhost /]# ping webserver4.192.168.100.100.nip.io
PING webserver4.192.168.100.100.nip.io (192.168.100.100) 56(84) bytes of data.
```



webserver1.192.168.200.20.nip.io

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

```
NAME         TYPE           CLUSTER-IP     EXTERNAL-IP      PORT(S)          AGE
kubernetes   ClusterIP      10.96.0.1      <none>           443/TCP          24m
nginx-lb     LoadBalancer   10.96.18.33    172.16.200.100   8080:30924/TCP   19s
```

```
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
    body {
        width: 35em;
        margin: 0 auto;
        font-family: Tahoma, Verdana, Arial, sans-serif;
    }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
```

```
NAME         TYPE           CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes   ClusterIP      10.96.0.1       <none>           443/TCP          114m
nginx-lb     LoadBalancer   10.96.53.164    172.17.200.100   8080:30405/TCP   49m
nginx-lb2    LoadBalancer   10.96.215.203   172.17.201.100   8080:30744/TCP   11m
```

```
root@kind:/# curl 172.17.201.100:8080
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
    body {
        width: 35em;
        margin: 0 auto;
        font-family: Tahoma, Verdana, Arial, sans-serif;
    }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
```

```
NAME       TYPE        CLUSTER-IP    EXTERNAL-IP   PORT(S)                  AGE
kube-dns   ClusterIP   10.96.0.10    <none>        53/UDP,53/TCP,9153/TCP   16h
```

```
NAME          TYPE           CLUSTER-IP      EXTERNAL-IP      PORT(S)                          AGE
coredns-tcp   LoadBalancer   10.96.37.159    172.17.200.101   53:30121/TCP                     25s
coredns-udp   LoadBalancer   10.96.191.45    172.17.200.101   53:32329/UDP                     19s
kube-dns      NodePort       10.96.0.10      <none>           53:32207/UDP,53:30962/TCP,9153:31882/TCP   17h
```

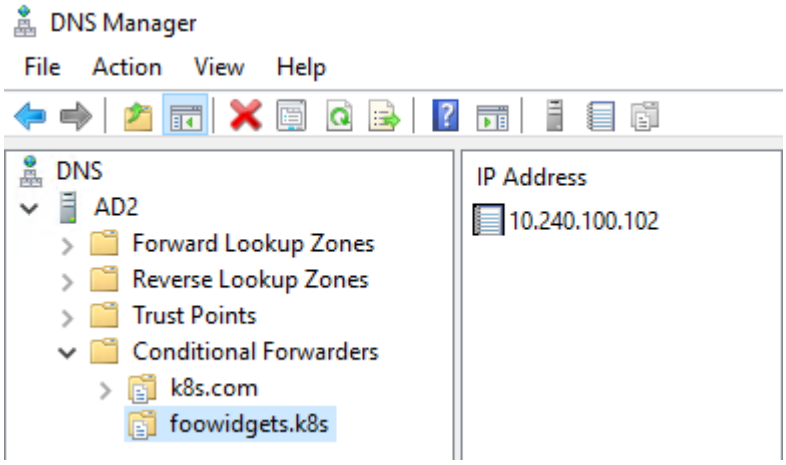
```
NAME                                                              READY   STATUS    RESTARTS   AGE
coredns-66bff467f8-fq7lf                                          1/1     Running   0          11d
coredns-66bff467f8-w52qp                                          1/1     Running   0          11d
etcd-cluster-67thf88kt1                                           1/1     Running   0          77s
etcd-cluster-dccdn6pk6c                                           1/1     Running   0          36s
etcd-cluster-sbtfh9bfzq                                           1/1     Running   0          96s
etcd-dns-etcd-operator-etcd-backup-operator-756d9b664c-kg7sd      1/1     Running   0          111s
etcd-dns-etcd-operator-etcd-operator-d76f944fd-tlt29              1/1     Running   0          111s
etcd-dns-etcd-operator-etcd-restore-operator-59b6c9486c-vkrn8     1/1     Running   0          111s
etcd-kind-control-plane                                           1/1     Running   0          11d
```

```
etcd-cluster-client   ClusterIP   10.96.181.53   <none>   2379/TCP
```

```
bash-5.0# nslookup nginx.foowidgets.k8s
Server:         10.96.0.10
Address:        10.96.0.10#53

Name:   nginx.foowidgets.k8s
Address: 172.17.200.101
```

```
NAME            TYPE           CLUSTER-IP      EXTERNAL-IP      PORT(S)          AGE
kubernetes      ClusterIP      10.96.0.1       <none>           443/TCP          42h
nginx-ext-dns   LoadBalancer   10.96.5.169     172.17.201.101   8080:31602/TCP   104s
nginx-lb        LoadBalancer   10.96.53.164    172.17.200.100   8080:30405/TCP   41h
nginx-lb2       LoadBalancer   10.96.215.203   172.17.201.100   8080:30744/TCP   41h
```

```
bash-5.0# curl nginx.foowidgets.k8s:8080
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
    body {
        width: 35em;
        margin: 0 auto;
        font-family: Tahoma, Verdana, Arial, sans-serif;
    }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
```



```
PS C:\> nslookup nginx.foowidgets.k8s
Server:  AD2.hyper-vplanet.com
Address:  10.2.1.14

Non-authoritative answer:
Name:    nginx.foowidgets.k8s
Address:  10.2.1.74
```

Not secure | nginx.foowidgets.k8s:8080

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

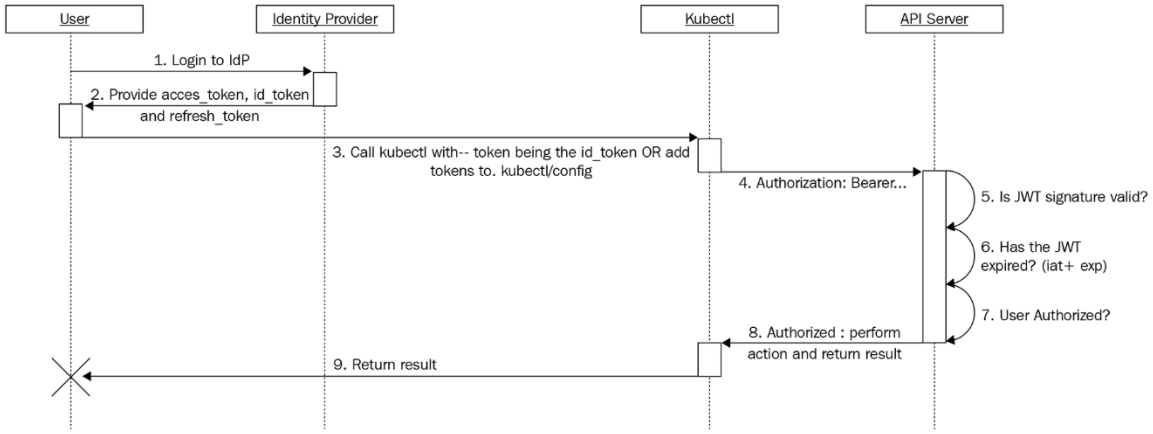
Thank you for using nginx.

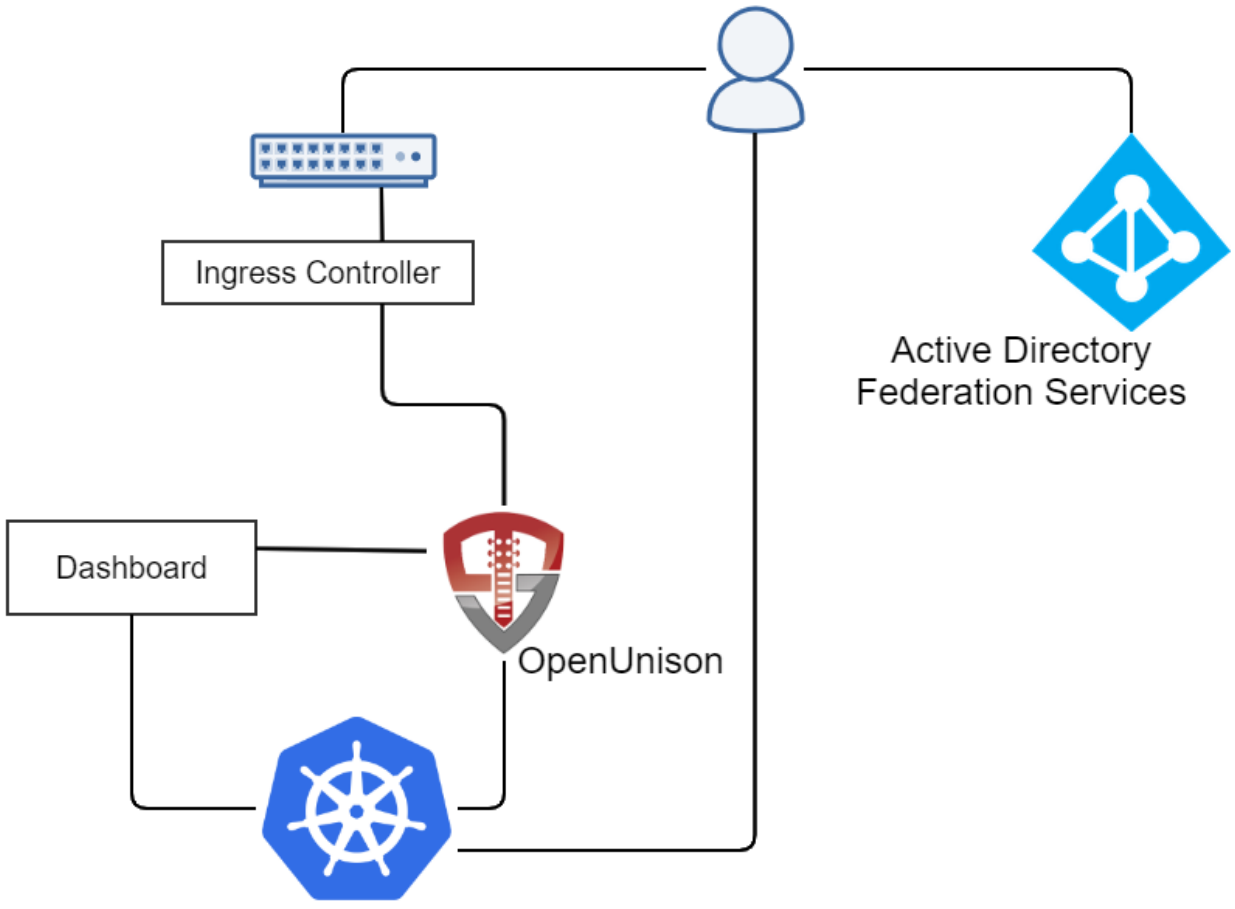
```
Non-authoritative answer:
Name:    microbot.foowidgets.k8s
Address:  10.2.1.65
```

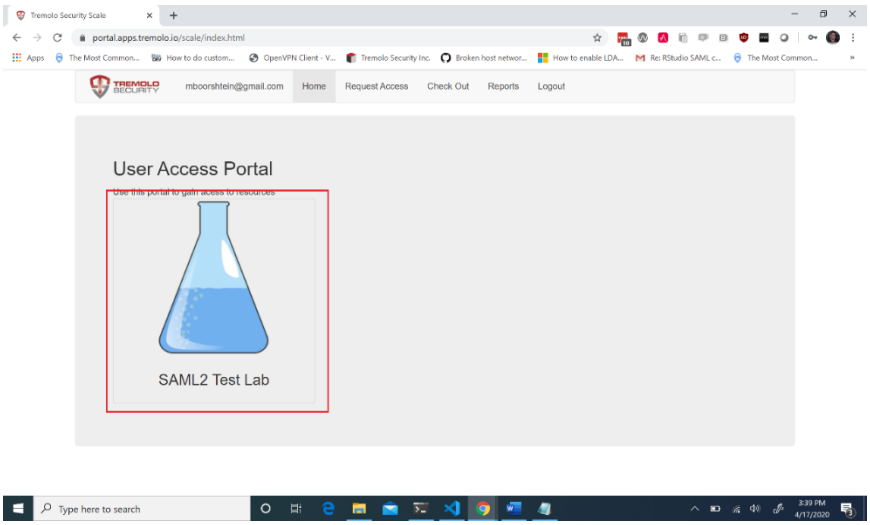
Not secure | microbot.foowidgets.k8s/

Container hostname: microbot-5b8559b777-h6tpp

Chapter 7: Integrating Authentication into Your Cluster







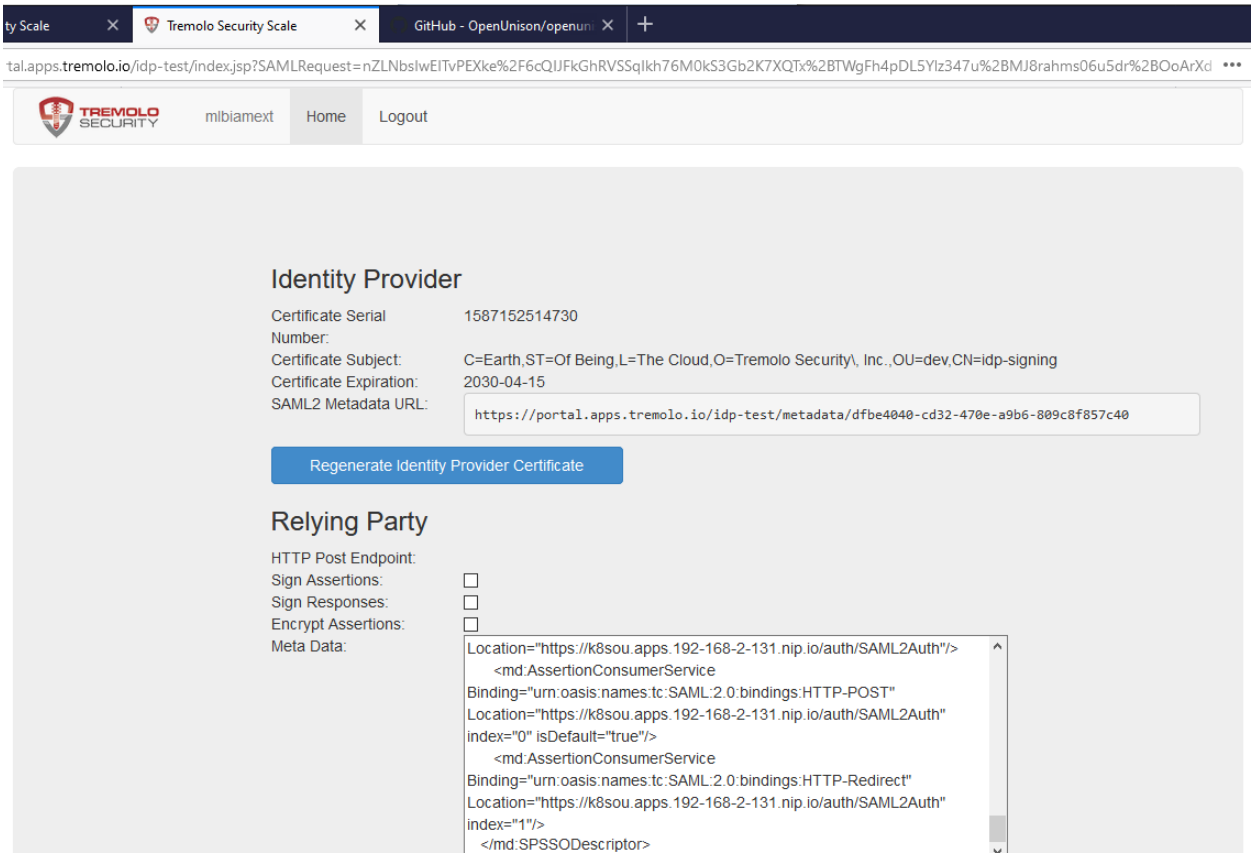
Identity Provider

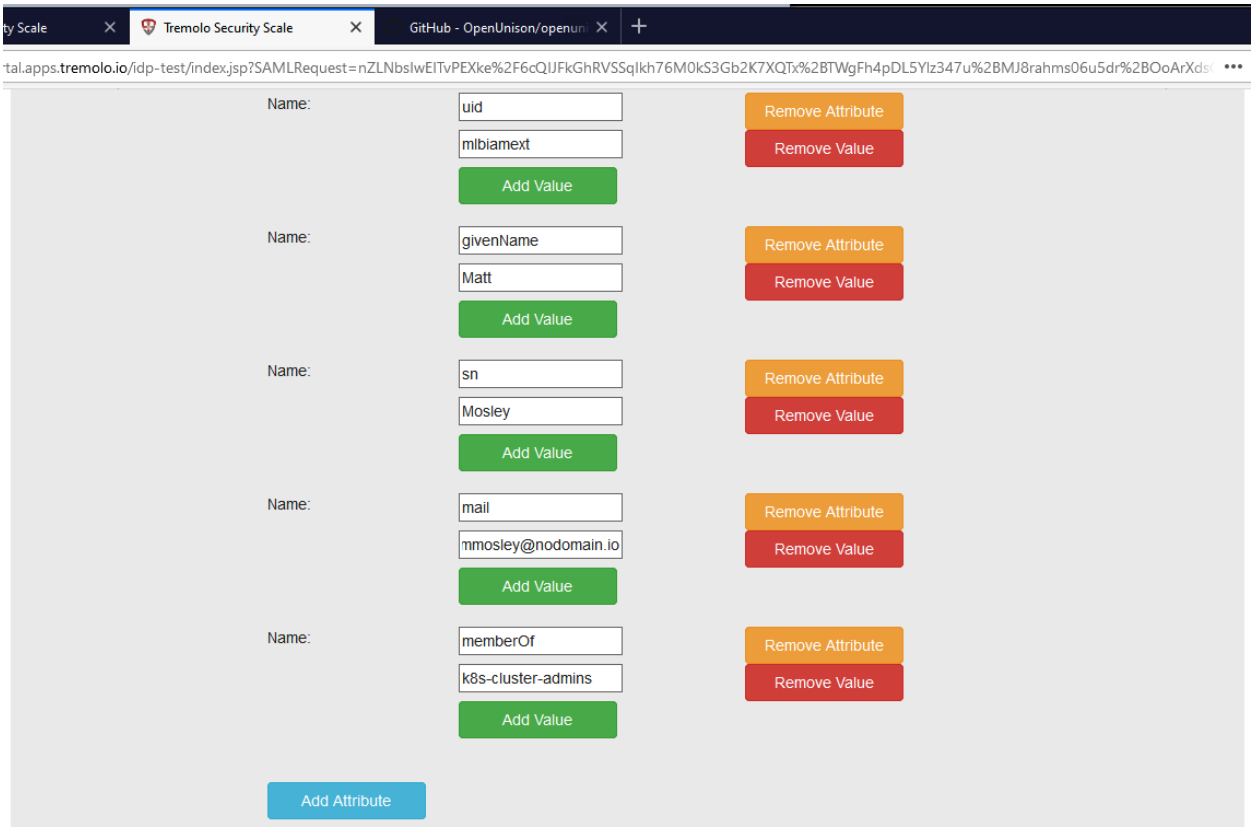
Certificate Serial Number:	1587152514730
Certificate Subject:	C=Earth,ST=Of Being,L=The Cloud,O=Tremolo Security\, Inc.,OU=dev,CN=idp-signing
Certificate Expiration:	2030-04-15
SAML2 Metadata URL:	`https://portal.apps.tremolo.io/idp-test/metadata/dfbe4040-cd32-470e-a9b6-809c8f857c40`

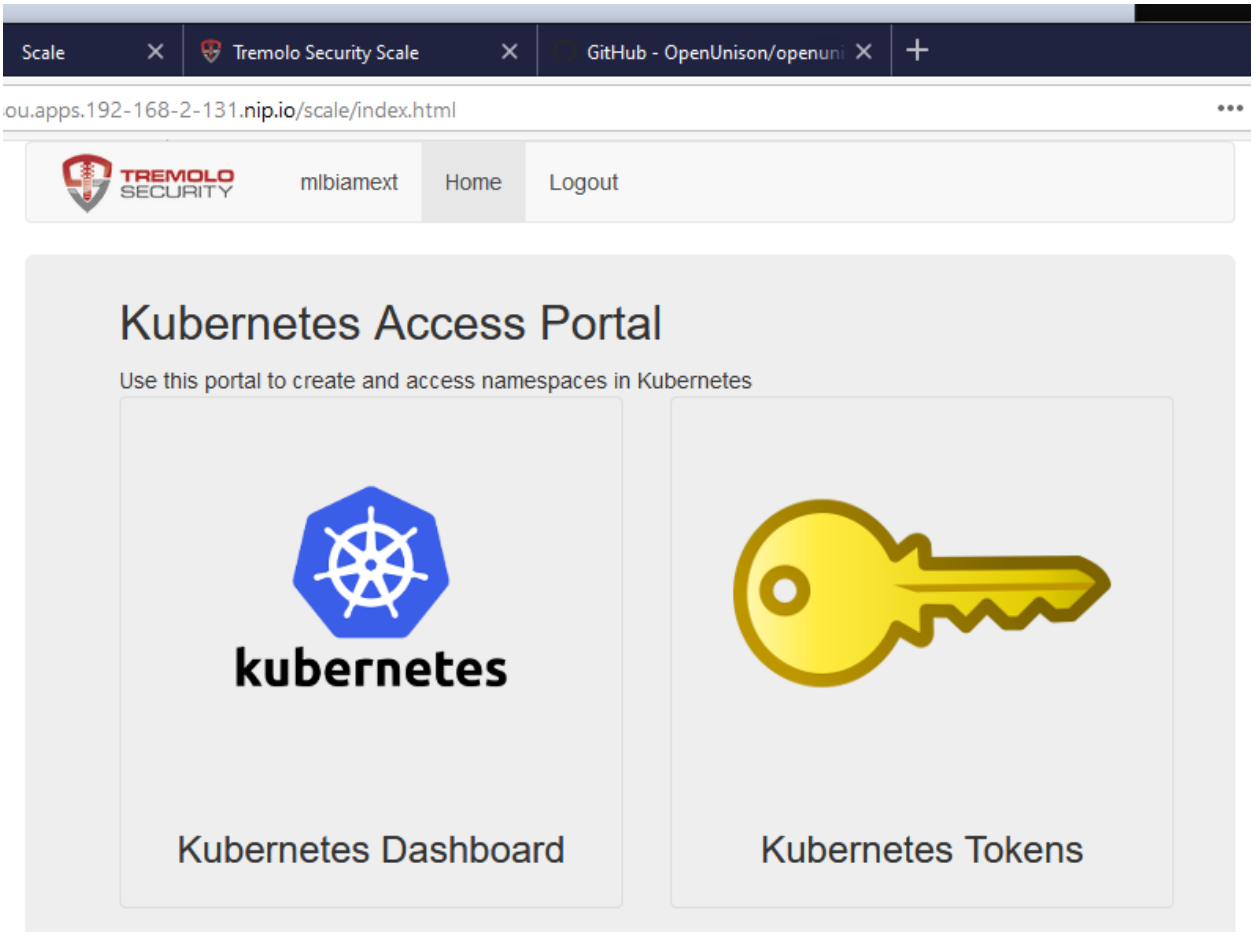
Regenerate Identity Provider Certificate

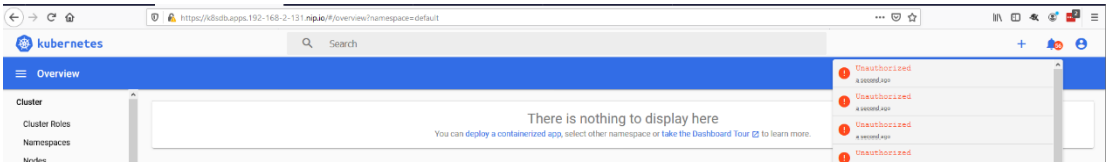
Relying Party

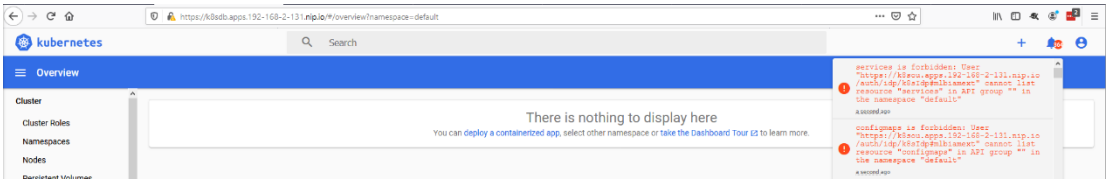
Signing Certificate:	CN=unison-saml2-rp-sig, OU=Kubernetes, O=MyOrg, L=My Cluster, ST=State of Cluster, C=MyCountry / 2021-08-22
HTTP Post Endpoint:	https://k8sou.apps.192-168-2-144.nip.io/auth/SAML2Auth
Sign Assertions:	☑
Sign Responses:	☐

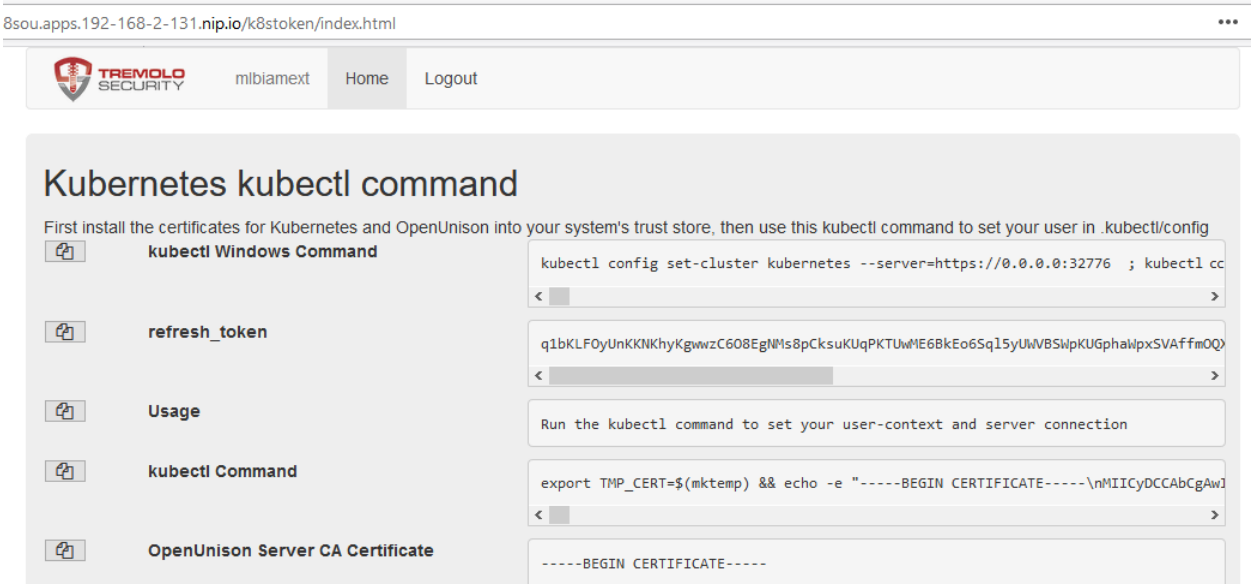

Tremolo Security Scale
GitHub - OpenUnison/openun
tal.apps.tremolo.io/idp-test/index.jsp?SAMLRequest=nZLNbsIwEITvPEXke%2F6cQIJFkGhRVSSqIkh76M0kS3Gb2K7XQTx%2BTWgFh4pDL5Ylz347u%2BMJ8rahms06u5dr%2BOoArXd
TREMOLO SECURITY
mlbiamext
Home
Logout
Identity Provider
Certificate Serial Number:
1587152514730
Certificate Subject:
C=Earth,ST=Of Being,L=The Cloud,O=Tremolo Security\, Inc.,OU=dev,CN=idp-signing
Certificate Expiration:
2030-04-15
SAML2 Metadata URL:
https://portal.apps.tremolo.io/idp-test/metadata/dfbe4040-cd32-470e-a9b6-809c8f857c40
Regenerate Identity Provider Certificate
Relying Party
HTTP Post Endpoint:
Sign Assertions:
Sign Responses:
Encrypt Assertions:
Meta Data:
Location="https://k8sou.apps.192-168-2-131.nip.io/auth/SAML2Auth"/>
<md:AssertionConsumerService
Binding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-POST"
Location="https://k8sou.apps.192-168-2-131.nip.io/auth/SAML2Auth"
index="0" isDefault="true"/>
<md:AssertionConsumerService
Binding="urn:oasis:names:tc:SAML:2.0:bindings:HTTP-Redirect"
Location="https://k8sou.apps.192-168-2-131.nip.io/auth/SAML2Auth"
index="1"/>
</md:SPSSODescriptor>

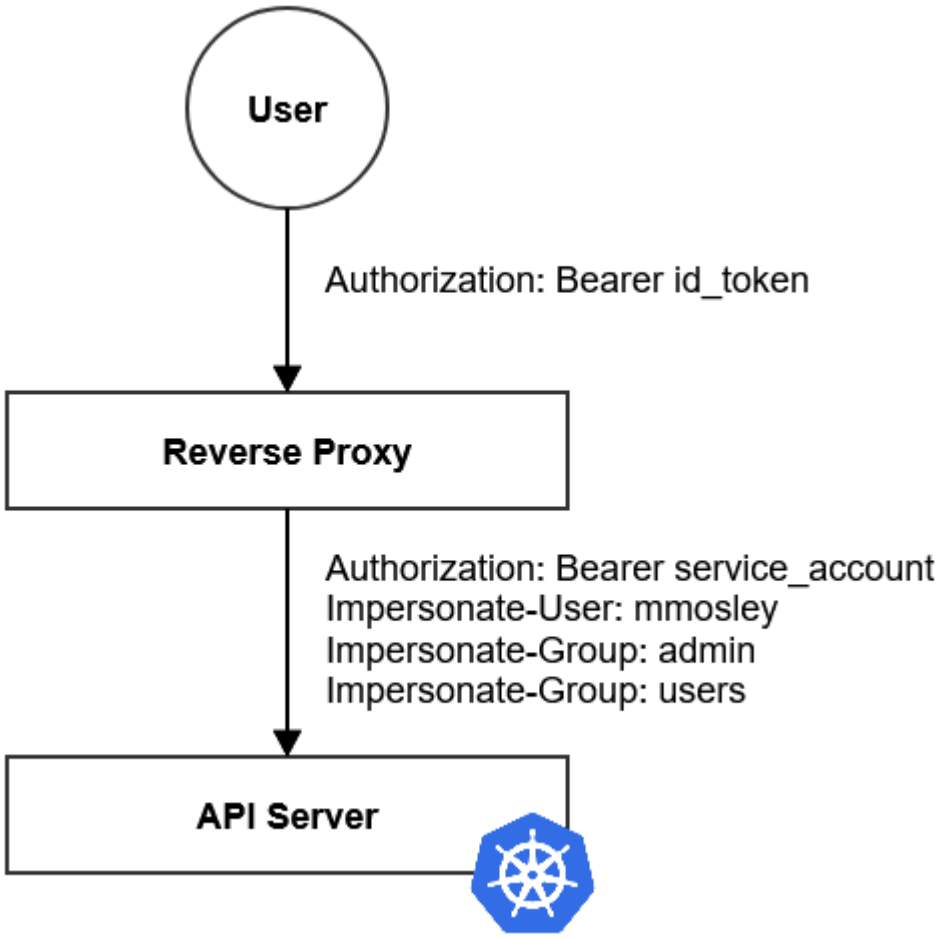

Tremolo Security Scale
GitHub - OpenUnison/openun
tal.apps.tremolo.io/idp-test/index.jsp?SAMLRequest=nZLNbsIwEITvPEXke%2F6cQIJFkGhRVSSqIkh76M0kS3Gb2K7XQTx%2BTWgFh4pDL5Ylz347u%2BMJ8rahms06u5dr%2BOoArXd
Name:
uid
mlbiamext
Add Value
Remove Attribute
Remove Value
Name:
givenName
Matt
Add Value
Remove Attribute
Remove Value
Name:
sn
Mosley
Add Value
Remove Attribute
Remove Value
Name:
mail
mmosley@nodomain.io
Add Value
Remove Attribute
Remove Value
Name:
memberOf
k8s-cluster-admins
Add Value
Remove Attribute
Remove Value
Add Attribute

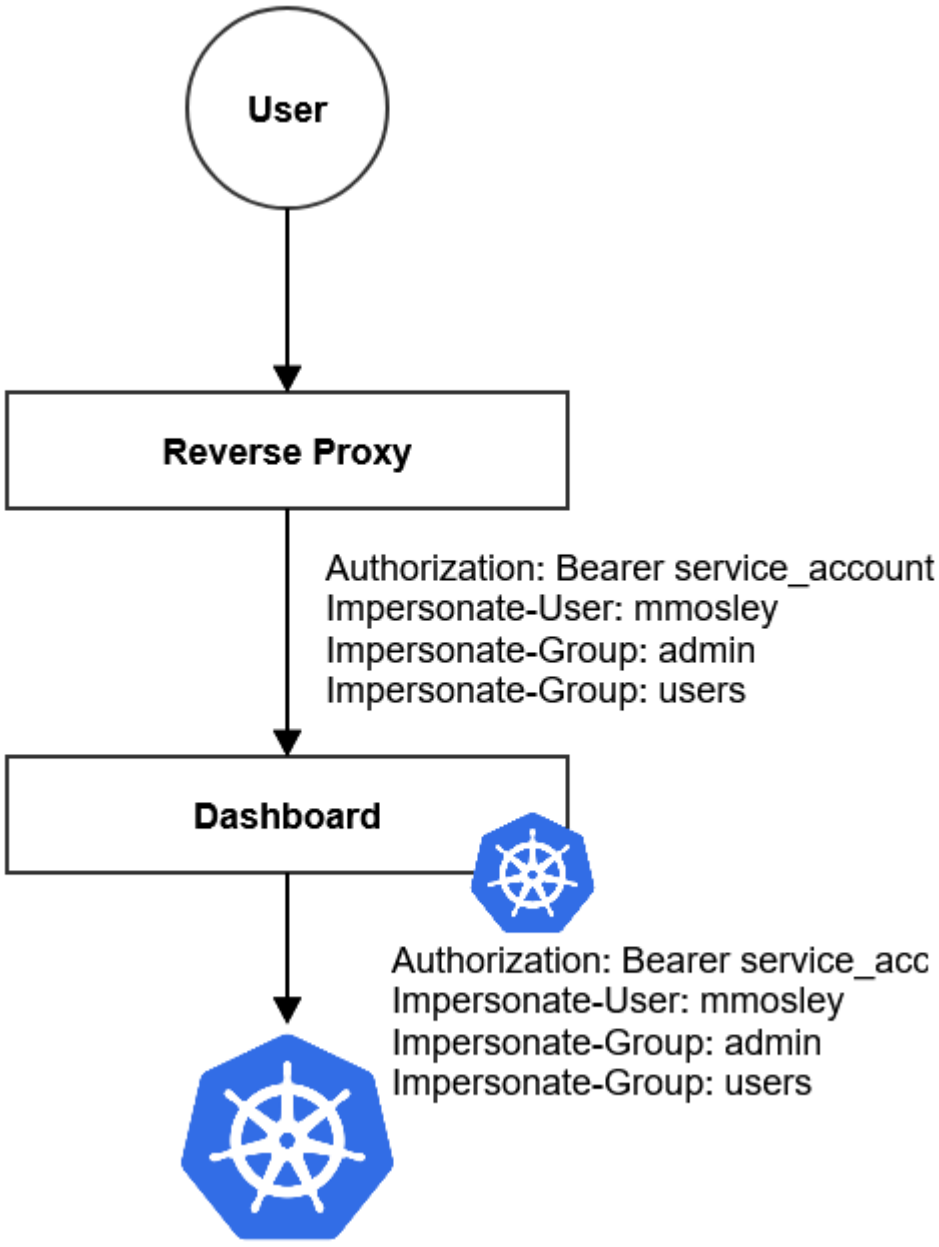

Scale
Tremolo Security Scale
GitHub - OpenUnison/openuni
ou.apps.192-168-2-131.nip.io/scale/index.html
TREMOLO SECURITY
mlbiamext
Home
Logout
Kubernetes Access Portal
Use this portal to create and access namespaces in Kubernetes
kubernetes
Kubernetes Dashboard
Kubernetes Tokens


kubernetes
Search
Overview
Cluster
Cluster Roles
Namespaces
There is nothing to display here
Unauthorized


kubernetes
Search
Overview
Cluster
Cluster Roles
Namespaces
Nodes
There is nothing to display here

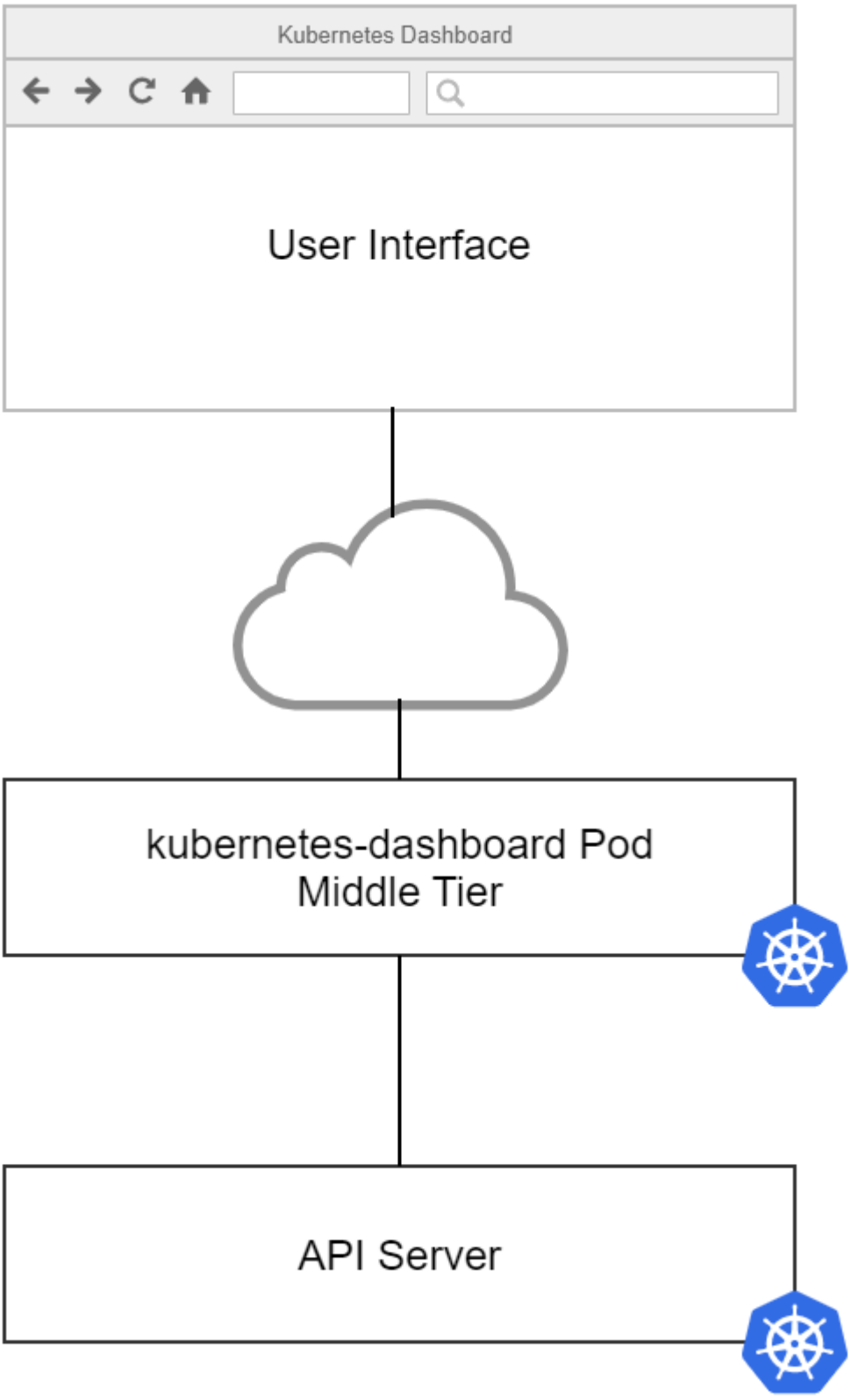

8sou.apps.192-168-2-131.nip.io/k8stoken/index.html
TREMOLO SECURITY
mlbiamext
Home
Logout
Kubernetes kubectl command
First install the certificates for Kubernetes and OpenUnison into your system's trust store, then use this kubectl command to set your user in .kubectl/config
kubectl Windows Command
kubectl config set-cluster kubernetes --server=https://0.0.0.0:32776 ; kubectl cc
refresh_token
q1bKLFOyUnKKNKhyKgwwzC6O8EgNMs8pCksuKUqPKTUwME6BkEo6Sql5yUWVBSWpKUGphaWpxSVAffmOQ
Usage
Run the kubectl command to set your user-context and server connection
kubectl Command
export TMP_CERT=$(mktemp) && echo -e "-----BEGIN CERTIFICATE-----\nMIICyDCCAbCgAwI
OpenUnison Server CA Certificate
-----BEGIN CERTIFICATE-----


User
Authorization: Bearer id_token
Reverse Proxy
Authorization: Bearer service_account
Impersonate-User: mmosley
Impersonate-Group: admin
Impersonate-Group: users
API Server

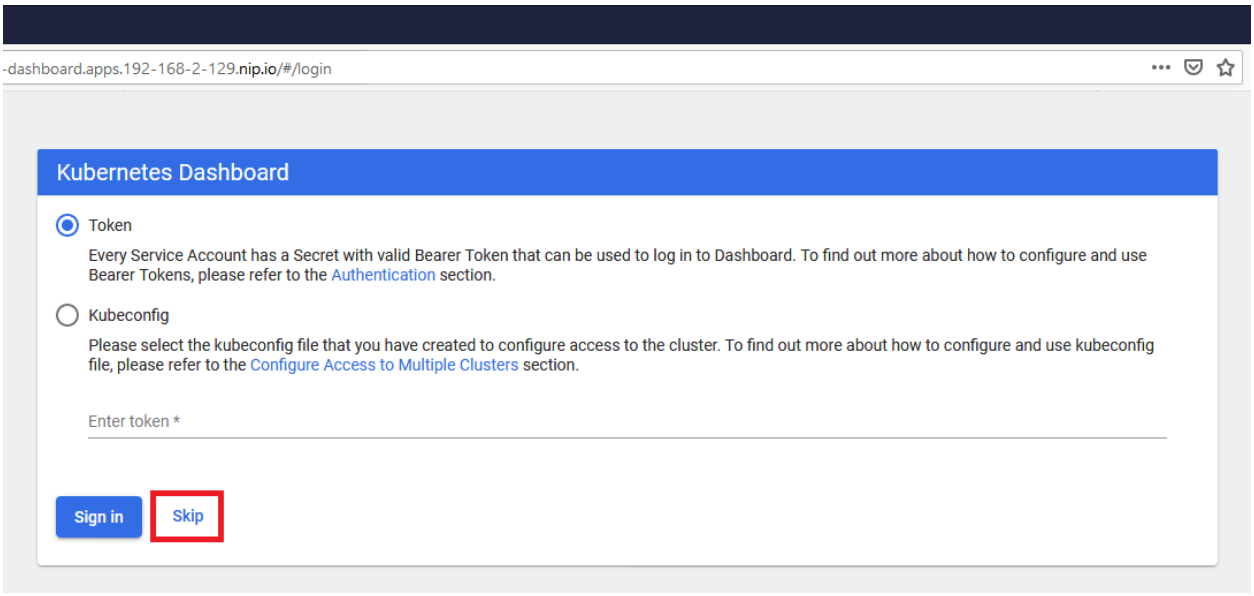

User
Reverse Proxy
Authorization: Bearer service_account
Impersonate-User: mmosley
Impersonate-Group: admin
Impersonate-Group: users
Dashboard
Authorization: Bearer service_acc
Impersonate-User: mmosley
Impersonate-Group: admin
Impersonate-Group: users

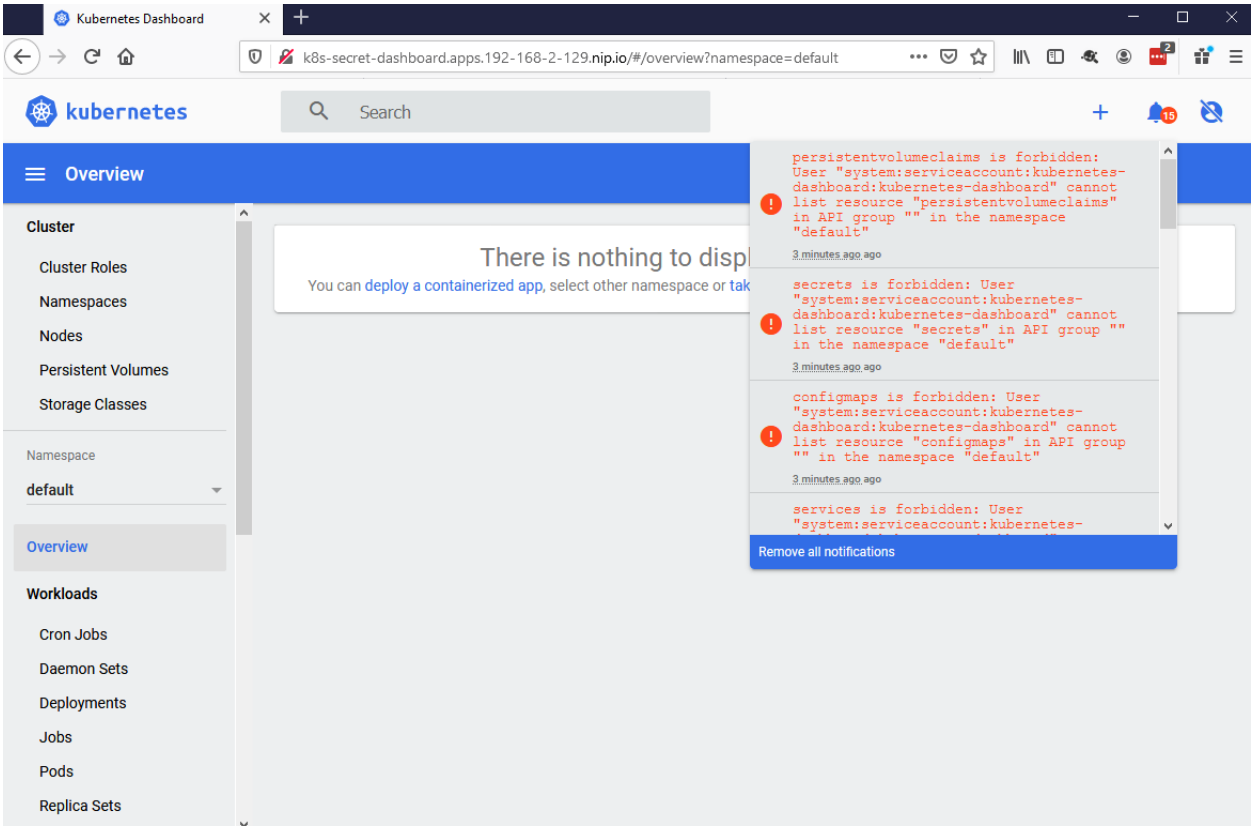
Chapter 8: RBAC Policies and Auditing

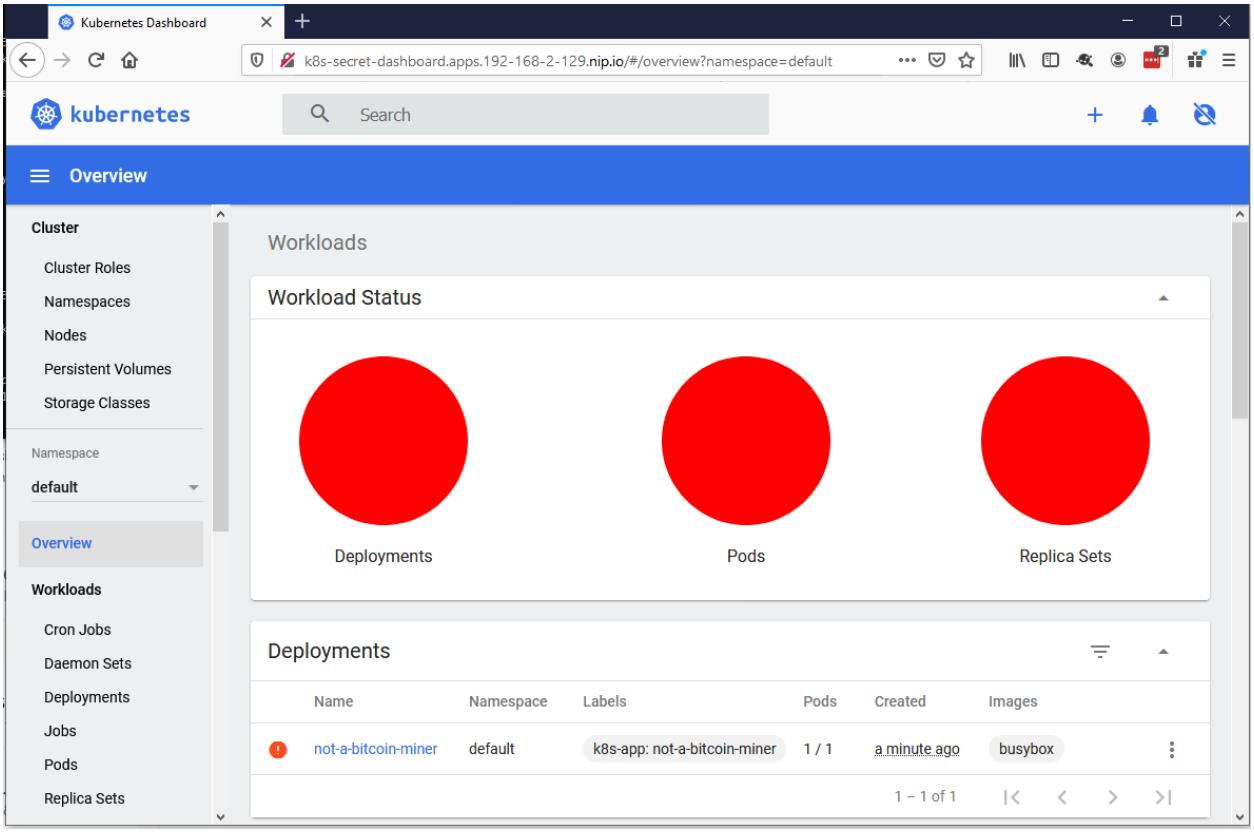
Chapter 9: Securing the Kubernetes Dashboard

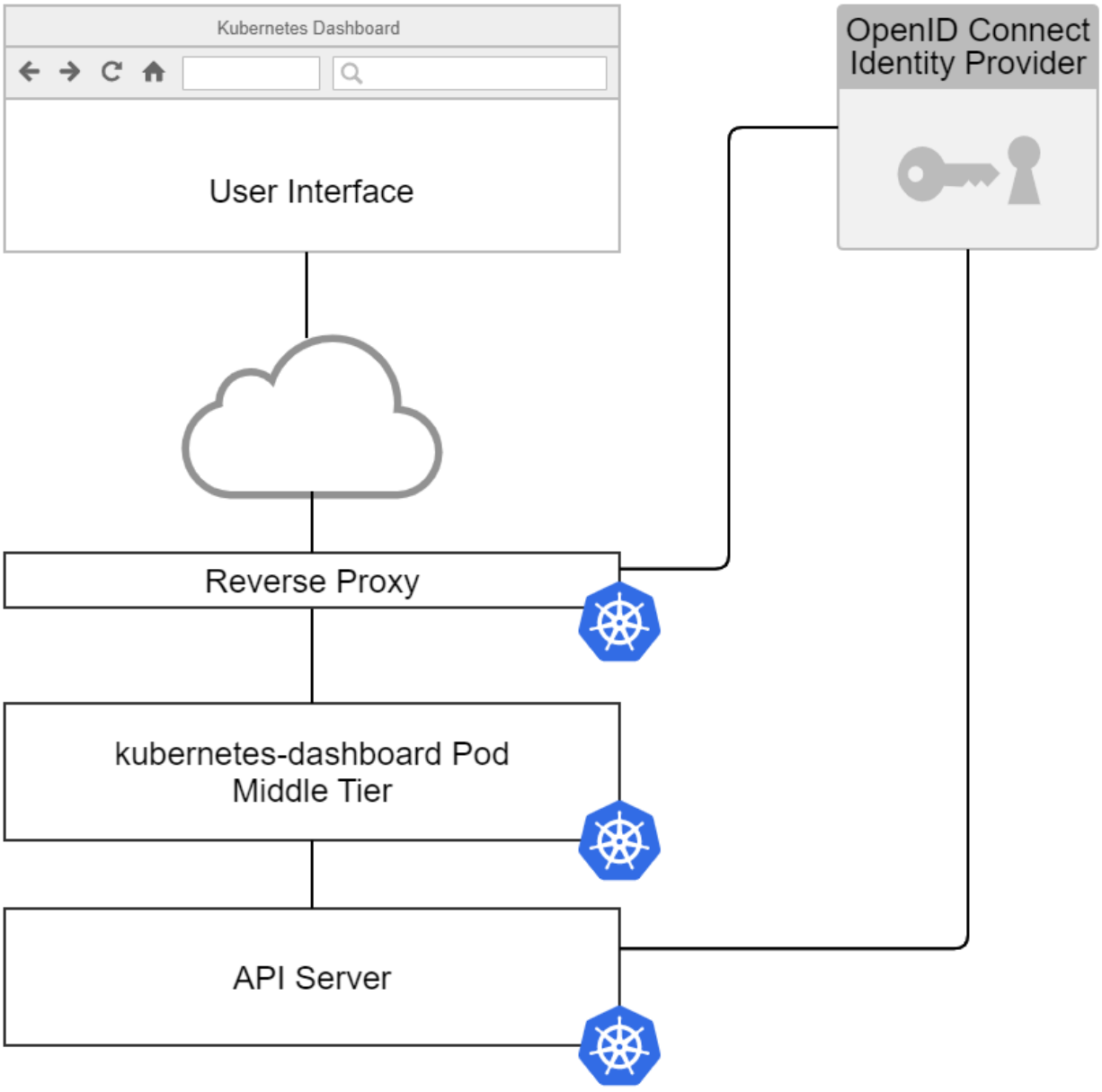


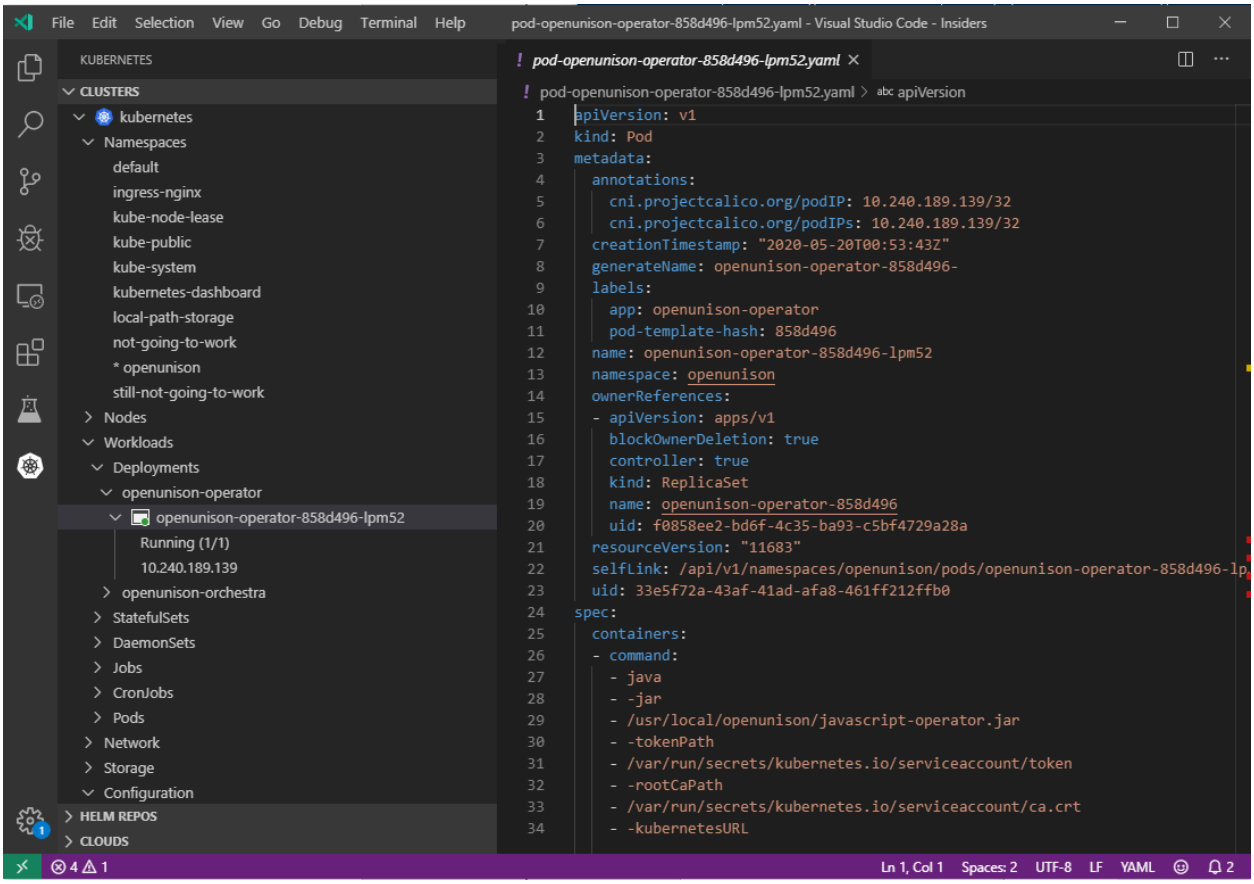
```
template:
  metadata:
    creationTimestamp: null
    labels:
      k8s-app: kubernetes-dashboard
  spec:
    containers:
    - args:
      - --auto-generate-certificates
      - --namespace=kubernetes-dashboard
      - --enable-skip-login
      image: kubernetesui/dashboard:v2.0.0
      imagePullPolicy: Always
      livenessProbe:
```

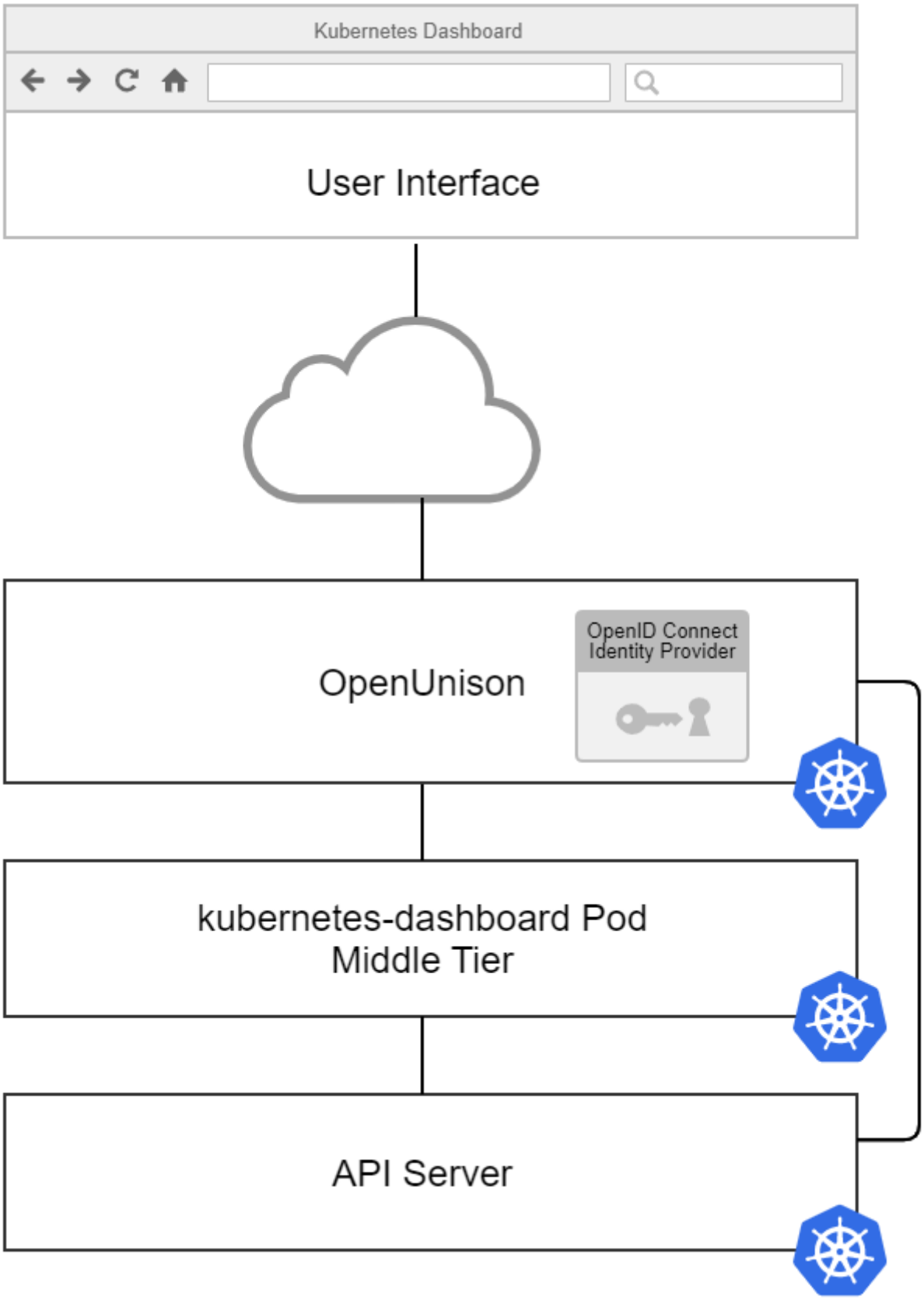



Kubernetes Dashboard
k8s-secret-dashboard.apps.192-168-2-129.nip.io/#/overview?namespace=default
kubernetes
Search
Overview
Cluster
Cluster Roles
Namespaces
Nodes
Persistent Volumes
Storage Classes
Namespace
default
Overview
Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Replica Sets
There is nothing to displ
You can deploy a containerized app, select other namespace or tak
persistentvolumeclaims is forbidden: User "system:serviceaccount:kubernetes-dashboard:kubernetes-dashboard" cannot list resource "persistentvolumeclaims" in API group "" in the namespace "default"
3 minutes ago ago
secrets is forbidden: User "system:serviceaccount:kubernetes-dashboard:kubernetes-dashboard" cannot list resource "secrets" in API group "" in the namespace "default"
3 minutes ago ago
configmaps is forbidden: User "system:serviceaccount:kubernetes-dashboard:kubernetes-dashboard" cannot list resource "configmaps" in API group "" in the namespace "default"
3 minutes ago ago
services is forbidden: User "system:serviceaccount:kubernetes-
Remove all notifications


Kubernetes Dashboard
k8s-secret-dashboard.apps.192-168-2-129.nip.io/#/overview?namespace=default
kubernetes
Search
Overview
Cluster
Cluster Roles
Namespaces
Nodes
Persistent Volumes
Storage Classes
Namespace
default
Overview
Workloads
Cron Jobs
Daemon Sets
Deployments
Jobs
Pods
Replica Sets
Workloads
Workload Status
Deployments
Pods
Replica Sets
Deployments
Name
Namespace
Labels
Pods
Created
Images
not-a-bitcoin-miner
default
k8s-app: not-a-bitcoin-miner
1 / 1
a minute ago
busybox
1 – 1 of 1


Kubernetes Dashboard
User Interface
OpenID Connect
Identity Provider
Reverse Proxy
kubernetes-dashboard Pod
Middle Tier
API Server


File Edit Selection View Go Debug Terminal Help
pod-openunison-operator-858d496-lpm52.yaml - Visual Studio Code - Insiders
KUBERNETES
CLUSTERS
kubernetes
Namespaces
default
ingress-nginx
kube-node-lease
kube-public
kube-system
kubernetes-dashboard
local-path-storage
not-going-to-work
* openunison
still-not-going-to-work
Nodes
Workloads
Deployments
openunison-operator
openunison-operator-858d496-lpm52
Running (1/1)
10.240.189.139
openunison-orchestra
StatefulSets
DaemonSets
Jobs
CronJobs
Pods
Network
Storage
Configuration
HELM REPOS
CLOUDS
pod-openunison-operator-858d496-lpm52.yaml
pod-openunison-operator-858d496-lpm52.yaml > apiVersion
1 apiVersion: v1
2 kind: Pod
3 metadata:
4 annotations:
5 cni.projectcalico.org/podIP: 10.240.189.139/32
6 cni.projectcalico.org/podIPs: 10.240.189.139/32
7 creationTimestamp: "2020-05-20T00:53:43Z"
8 generateName: openunison-operator-858d496-
9 labels:
10 app: openunison-operator
11 pod-template-hash: 858d496
12 name: openunison-operator-858d496-lpm52
13 namespace: openunison
14 ownerReferences:
15 - apiVersion: apps/v1
16 blockOwnerDeletion: true
17 controller: true
18 kind: ReplicaSet
19 name: openunison-operator-858d496
20 uid: f0858ee2-bd6f-4c35-ba93-c5bf4729a28a
21 resourceVersion: "11683"
22 selfLink: /api/v1/namespaces/openunison/pods/openunison-operator-858d496-lp
23 uid: 33e5f72a-43af-41ad-afa8-461ff212ffb0
24 spec:
25 containers:
26 - command:
27 - java
28 - -jar
29 - /usr/local/openunison/javascript-operator.jar
30 - -tokenPath
31 - /var/run/secrets/kubernetes.io/serviceaccount/token
32 - -rootCaPath
33 - /var/run/secrets/kubernetes.io/serviceaccount/ca.crt
34 - -kubernetesURL
4 1
Ln 1, Col 1 Spaces: 2 UTF-8 LF YAML 2

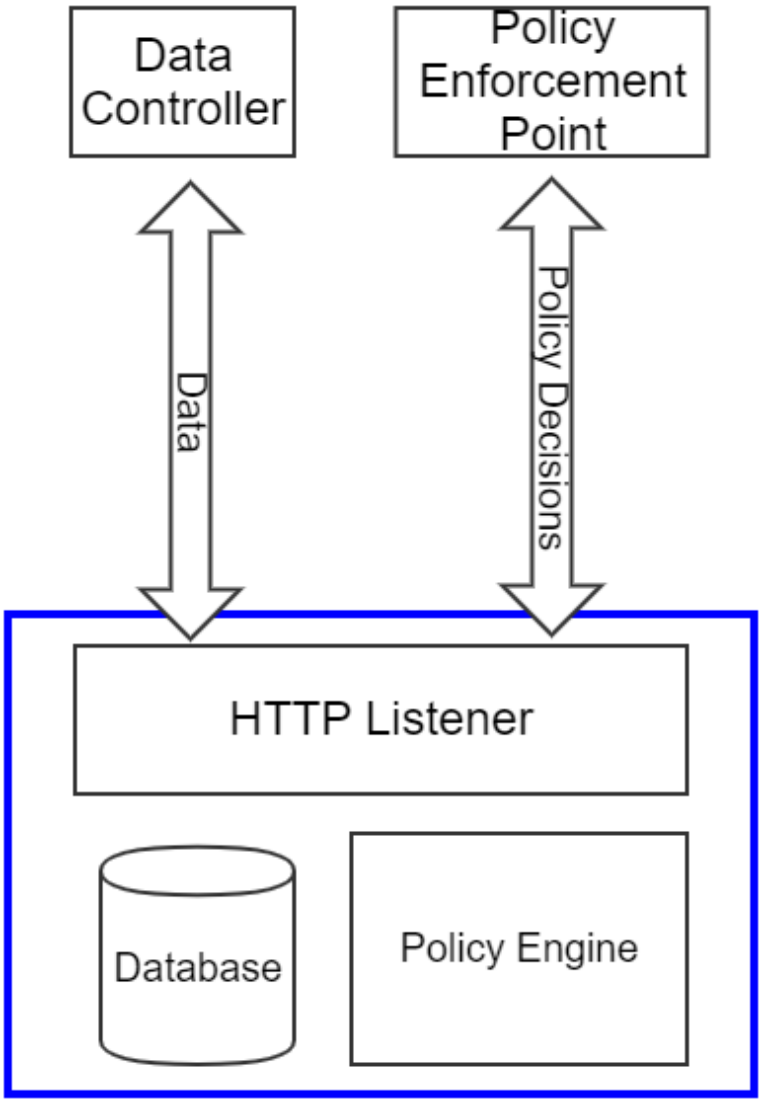

Kubernetes Dashboard
User Interface
OpenUnison
OpenID Connect
Identity Provider
kubernetes-dashboard Pod
Middle Tier
API Server

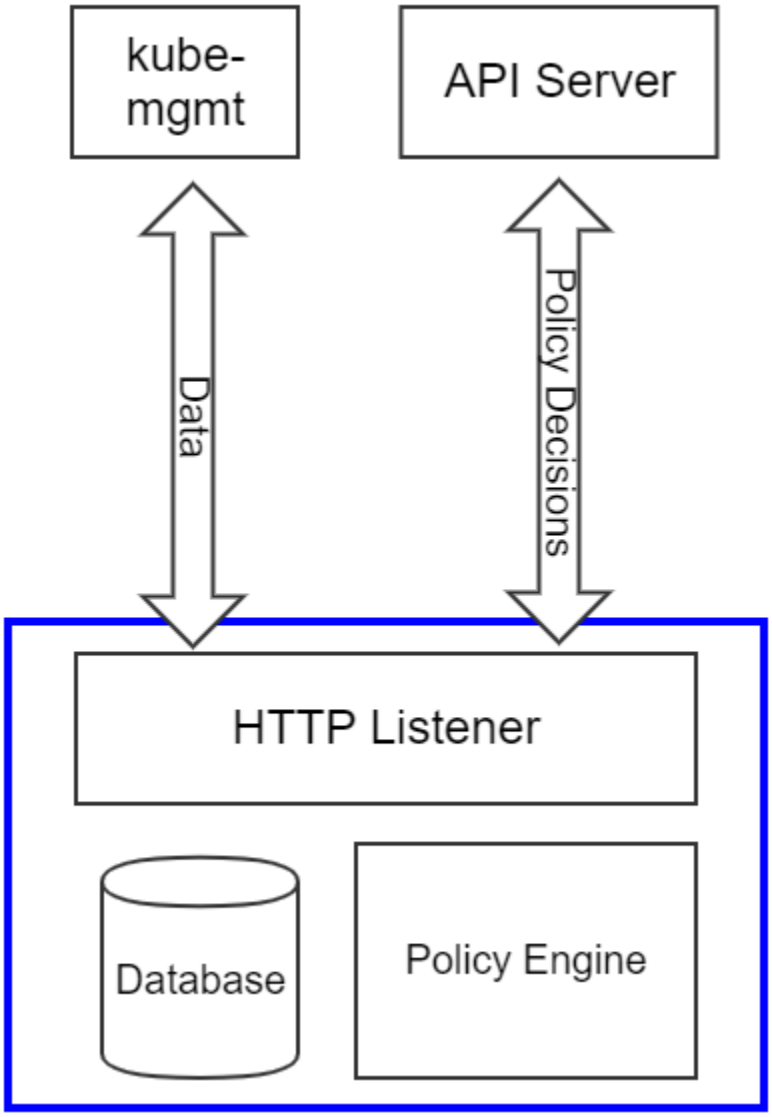
Chapter 10: Creating PodSecurity Policies

```
k8s@book:~$ ps -A -elf | grep java
4 S 431       18399 18346  0  80   0 - 875313 -     May28 ?        00:50:13 java -classpath /usr/local/openunison/work/webapp/WEB-INF/lib/*:/usr/local/openunison/work/webapp/
WEB-INF/classes:/tmp/quartz -Djava.awt.headless=true -Djava.security.egd=file:/dev/./urandom -DunisonEnvironmentFile=/etc/openunison/ou.env com.tremolosecurity.openunison.un
dertow.OpenUnisonOnUndertow /etc/openunison/openunison.yaml
4 S 431       23622 23514  0  80   0 - 770470 -     May19 ?        00:28:02 java -jar /usr/local/openunison/javascript-operator.jar -tokenPath /var/run/secrets/kubernetes.io/
serviceaccount/token -rootCaPath /var/run/secrets/kubernetes.io/serviceaccount/ca.crt -kubernetesURL https://kubernetes.default.svc.cluster.local -namespace NAMESPACE -apiGr
oup openunison.tremolo.io/v1 -objectType openunisons -jsPath /usr/local/openunison/js -configMaps /etc/extraMaps
0 S k8s       29943 29003  0  80   0 -  3607 pipe_w 09:12 pts/1    00:00:00 grep java
k8s@book:~$
```

```
k8s@book:~$ ps -elf | grep java
0 S k8s       9781 29447  0  80   0 -  3607 pipe_w 13:53 pts/0    00:00:00 grep java
4 S 431      17989 17570  0  80   0 - 769446 -     13:37 ?        00:00:06 java -jar /usr/local/openunison/javascript-operator.jar -tokenPath /var/run/secrets/kubernetes.io/service
account/token -rootCaPath /var/run/secrets/kubernetes.io/serviceaccount/ca.crt -kubernetesURL https://kubernetes.default.svc.cluster.local -namespace NAMESPACE -apiGroup openunison
.tremolo.io/v1 -objectType openunisons -jsPath /usr/local/openunison/js -configMaps /etc/extraMaps
4 S 431      22388 22322  4  80   0 - 874062 -     13:39 ?        00:00:36 java -classpath /usr/local/openunison/work/webapp/WEB-INF/lib/*:/usr/local/openunison/work/webapp/WEB-INF
/classes:/tmp/quartz -Djava.awt.headless=true -Djava.security.egd=file:/dev/./urandom -DunisonEnvironmentFile=/etc/openunison/ou.env com.tremolosecurity.openunison.undertow.OpenUni
sonOnUndertow /etc/openunison/openunison.yaml
k8s@book:~$ kubectl exec -ti openunison-orchestra-57489869d4-fqpnl -n openunison -- ps -A
  PID TTY          TIME CMD
    1 ?        00:00:00 run_openunison.
    9 ?        00:00:37 java
 1169 pts/0    00:00:00 ps
```

Chapter 11: Extending Security Using Open Policy Agent

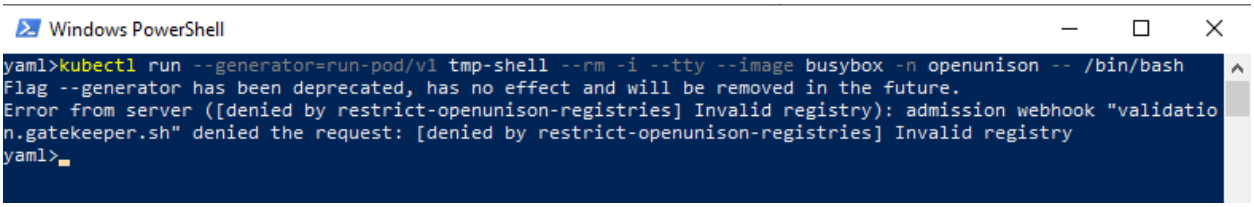


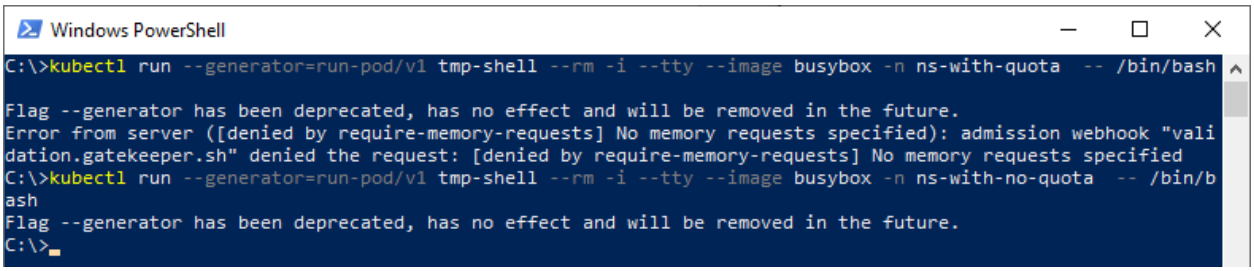

kube-
mgmt
API Server
Data
Policy Decisions
HTTP Listener
Database
Policy Engine

```
PS C:\Users\mlb> kubectl get crds
NAME                                                  CREATED AT
bgpconfigurations.crd.projectcalico.org               2020-07-04T17:14:08Z
bgppeers.crd.projectcalico.org                        2020-07-04T17:14:08Z
blockaffinities.crd.projectcalico.org                 2020-07-04T17:14:06Z
clusterinformations.crd.projectcalico.org             2020-07-04T17:14:08Z
configs.config.gatekeeper.sh                          2020-07-04T17:45:26Z
constraintpodstatuses.status.gatekeeper.sh            2020-07-04T17:45:26Z
constrainttemplatepodstatuses.status.gatekeeper.sh    2020-07-04T17:45:26Z
constrainttemplates.templates.gatekeeper.sh           2020-07-04T17:45:26Z
felixconfigurations.crd.projectcalico.org             2020-07-04T17:14:06Z
globalnetworkpolicies.crd.projectcalico.org           2020-07-04T17:14:08Z
globalnetworksets.crd.projectcalico.org               2020-07-04T17:14:08Z
hostendpoints.crd.projectcalico.org                   2020-07-04T17:14:08Z
ipamblocks.crd.projectcalico.org                      2020-07-04T17:14:06Z
ipamconfigs.crd.projectcalico.org                     2020-07-04T17:14:07Z
ipamhandles.crd.projectcalico.org                     2020-07-04T17:14:06Z
ippools.crd.projectcalico.org                         2020-07-04T17:14:08Z
k8sallowedregistries.constraints.gatekeeper.sh        2020-07-06T11:09:46Z
networkpolicies.crd.projectcalico.org                 2020-07-04T17:14:08Z
networksets.crd.projectcalico.org                     2020-07-04T17:14:08Z
oidc-sessions.openunison.tremolo.io                   2020-07-04T17:20:20Z
openunisons.openunison.tremolo.io                     2020-07-04T17:20:20Z
users.openunison.tremolo.io                           2020-07-04T17:20:20Z
PS C:\Users\mlb>
```

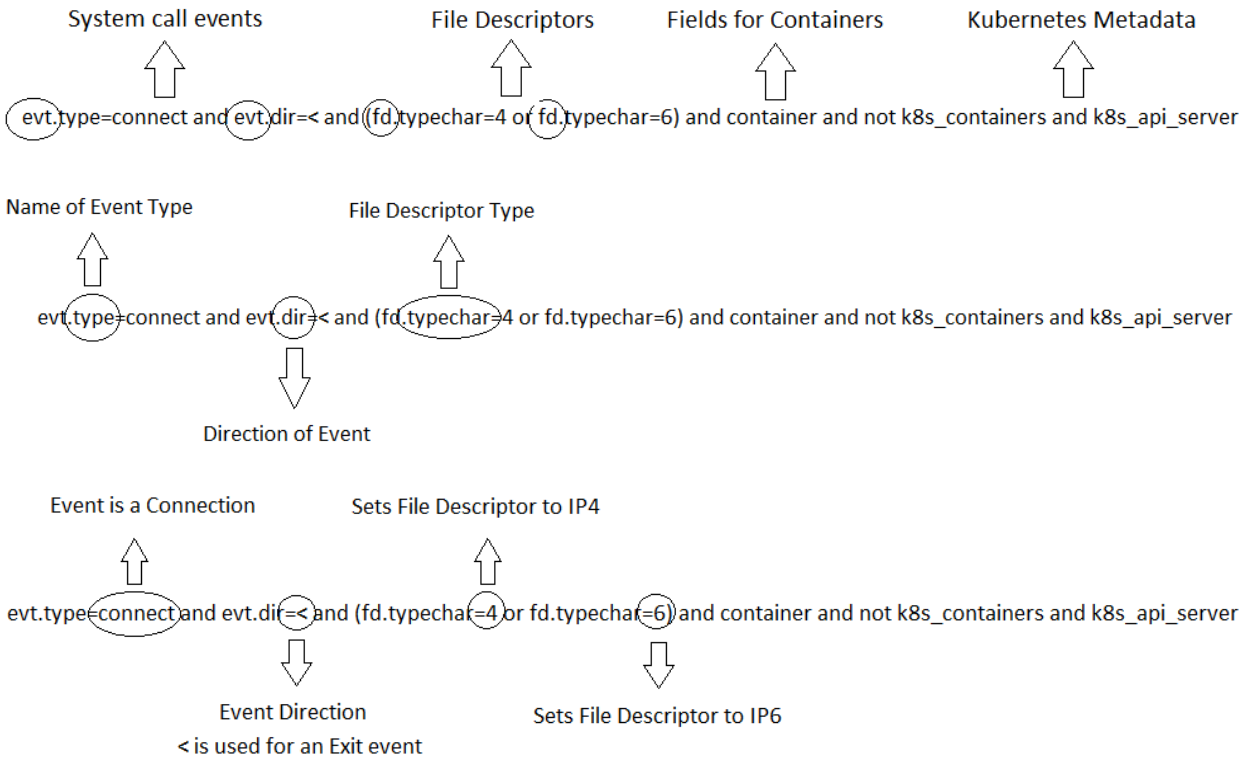
```
PS C:\Users\mlb> kubectl get pods -n openunison
NAME                                  READY   STATUS      RESTARTS   AGE
check-certs-orchestra-1593914400-pd5f5   0/1     Completed   0          40h
check-certs-orchestra-1594000800-zxjxr   0/1     Completed   0          16h
openunison-operator-858d496-5p4dm        1/1     Running     0          7h
openunison-orchestra-57489869d4-f46rm    1/1     Running     0          2d
PS C:\Users\mlb> kubectl delete pod -l app=openunison-operator -n openunison
pod "openunison-operator-858d496-5p4dm" deleted
PS C:\Users\mlb> kubectl get pods -n openunison
NAME                                  READY   STATUS      RESTARTS   AGE
check-certs-orchestra-1593914400-pd5f5   0/1     Completed   0          40h
check-certs-orchestra-1594000800-zxjxr   0/1     Completed   0          16h
openunison-orchestra-57489869d4-f46rm    1/1     Running     0          2d
PS C:\Users\mlb> kubectl get events -n openunison
LAST SEEN   TYPE      REASON         OBJECT                                    MESSAGE
26s         Normal    Killing        pod/openunison-operator-858d496-5p4dm     Stopping container openunison-operator
8s          Warning   FailedCreate   replicaset/openunison-operator-858d496    Error creating: admission webhook "validat
ion.gatekeeper.sh" denied the request: [denied by restrict-openunison-registries] Invalid registry
PS C:\Users\mlb>
```

```
totalViolations: 6
violations:
- enforcementAction: deny
  kind: CronJob
  message: Invalid registry
  name: check-certs-orchestra
  namespace: openunison
- enforcementAction: deny
  kind: Deployment
  message: Invalid registry
  name: openunison-operator
  namespace: openunison
- enforcementAction: deny
  kind: Deployment
  message: Invalid registry
  name: openunison-orchestra
  namespace: openunison
- enforcementAction: deny
  kind: Pod
  message: Invalid registry
  name: check-certs-orchestra-1593914400-pd5f5
  namespace: openunison
- enforcementAction: deny
  kind: Pod
  message: Invalid registry
  name: check-certs-orchestra-1594000800-zxjxr
  namespace: openunison
- enforcementAction: deny
  kind: Pod
  message: Invalid registry
  name: openunison-orchestra-57489869d4-f46rm
  namespace: openunison
```

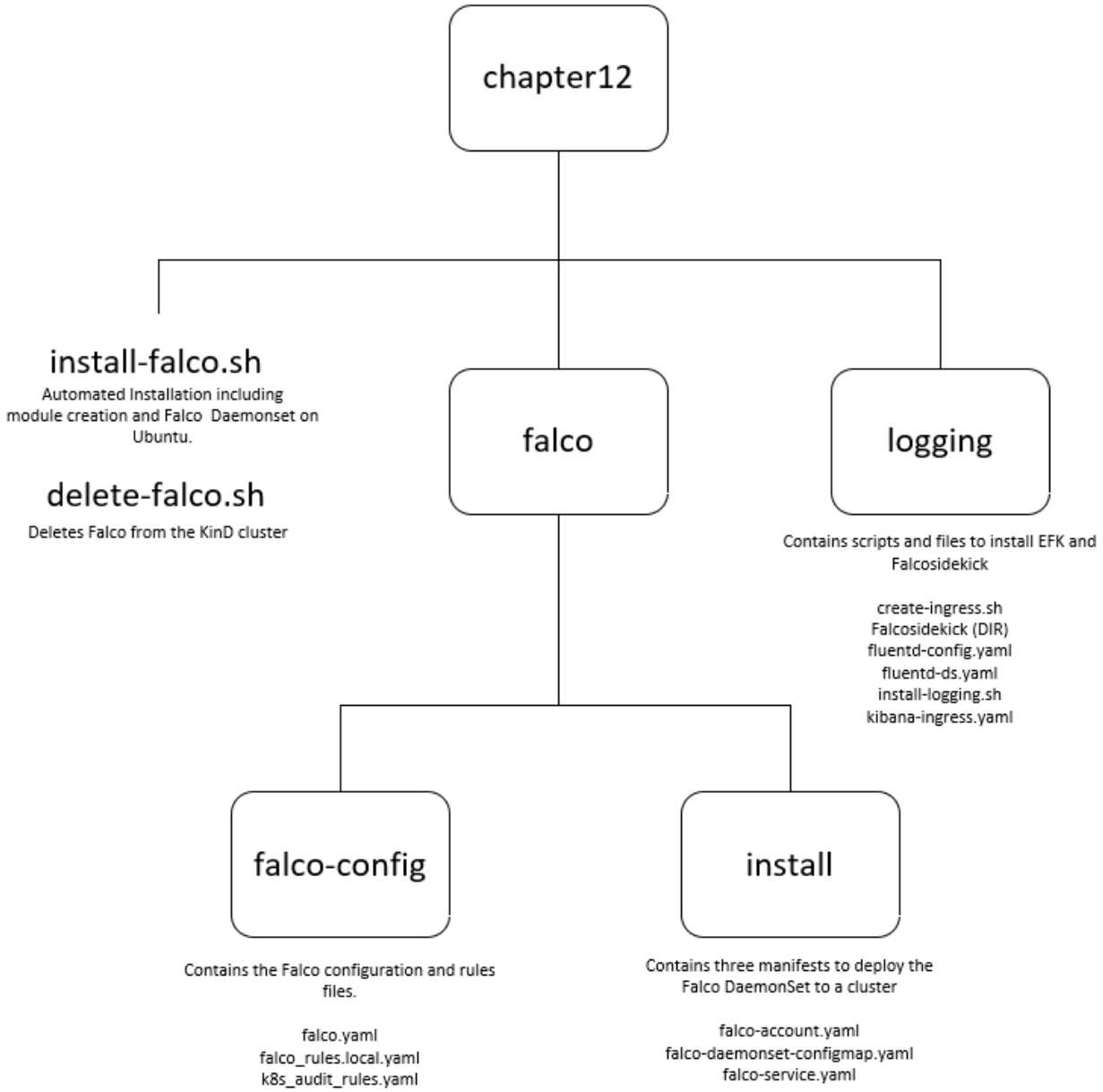




Chapter 12: Auditing using Falco and EFK




```
surovich@bookvm:/$ uname -v
#100-Ubuntu SMP Wed Apr 22 20:32:56 UTC 2020
surovich@bookvm:/$ uname -r
4.15.0-99-generic
```




```
* Setting up /usr/src links from host
* Unloading falco-probe, if present
* Running dkms install for falco
Error! echo
Your kernel headers for kernel 4.15.0-99-generic cannot be found at
/lib/modules/4.15.0-99-generic/build or /lib/modules/4.15.0-99-generic/source.
* Running dkms build failed, couldn't find /var/lib/dkms/falco/a259b4bf49c3330d9ad6c3eed9eb1a31954259a6/build/make.log
* Trying to load a system falco-probe, if present
* Trying to find precompiled falco-probe for 4.15.0-99-generic
Cannot find kernel config
Tue May  5 19:07:46 2020: Falco initialized with configuration file /etc/falco/falco.yaml
Tue May  5 19:07:46 2020: Loading rules from file /etc/falco/falco_rules.yaml:
Tue May  5 19:07:46 2020: Loading rules from file /etc/falco/falco_rules.local.yaml:
Tue May  5 19:07:47 2020: Loading rules from file /etc/falco/k8s_audit_rules.yaml:
Tue May  5 19:07:47 2020: Starting internal webserver, listening on port 8765
```

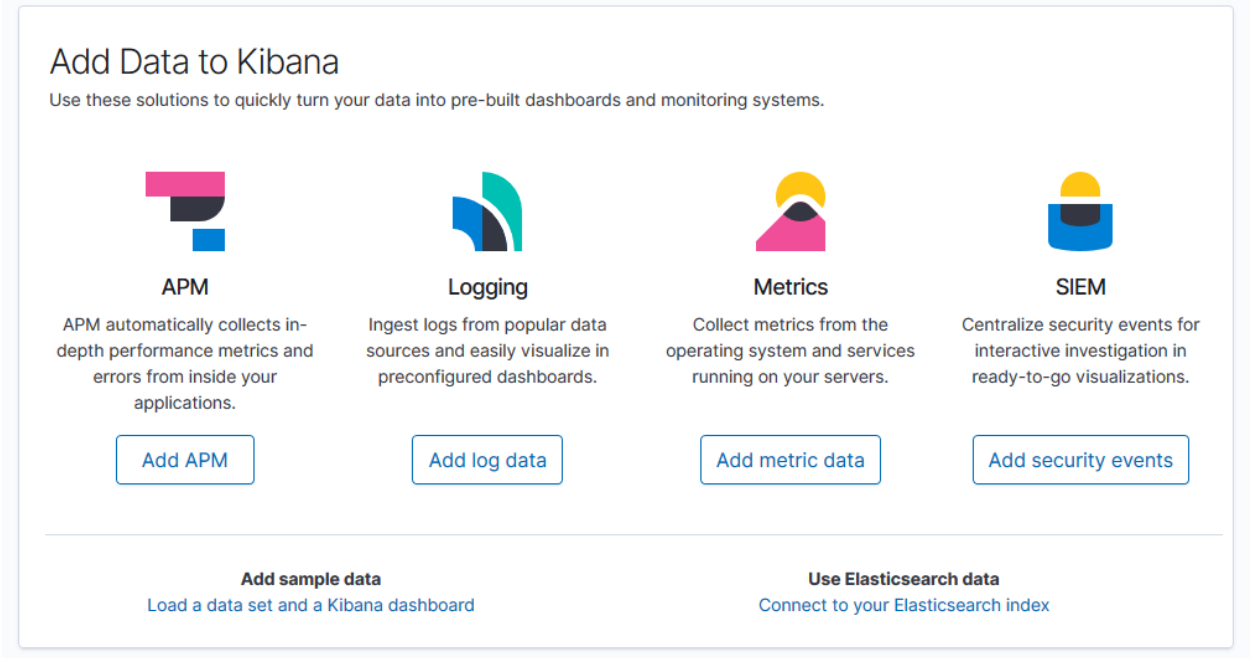
```
NAME                                                          READY   STATUS    RESTARTS   AGE
elasticsearch-elasticsearch-coordinating-only-569849ff87-5f87j   1/1     Running   1          10m
elasticsearch-elasticsearch-coordinating-only-569849ff87-7btph   1/1     Running   1          10m
elasticsearch-elasticsearch-data-0                            1/1     Running   1          10m
elasticsearch-elasticsearch-data-1                            1/1     Running   0          10m
elasticsearch-elasticsearch-master-0                          1/1     Running   1          10m
elasticsearch-elasticsearch-master-1                          1/1     Running   1          10m
```

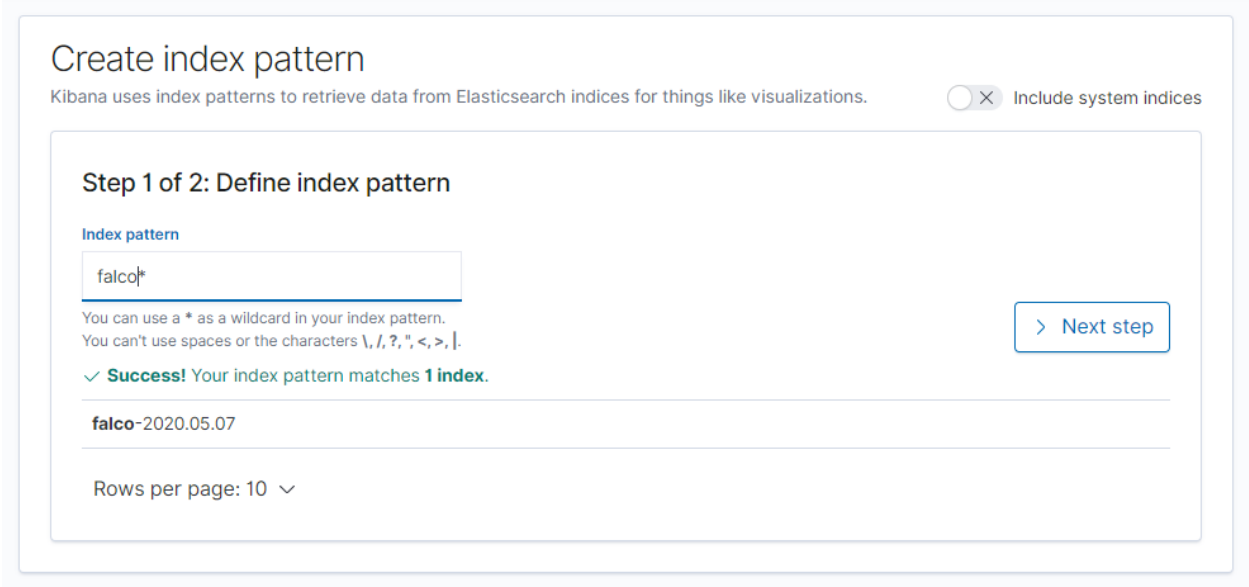
```
NAME                                          STATUS   VOLUME                                     CAPACITY
data-elasticsearch-elasticsearch-data-0       Bound    pvc-c6e73902-5b64-4fe2-9e6b-db3ce157942d   1Gi
data-elasticsearch-elasticsearch-data-1       Bound    pvc-901cc0c3-49e3-4125-b39f-98f35124fe7b   1Gi
data-elasticsearch-elasticsearch-master-0     Bound    pvc-c9009c3d-3ade-492f-8260-afc3881a3bb4   1Gi
data-elasticsearch-elasticsearch-master-1     Bound    pvc-624be8ff-bcc0-4498-97d4-43ccc151f727   1Gi
```

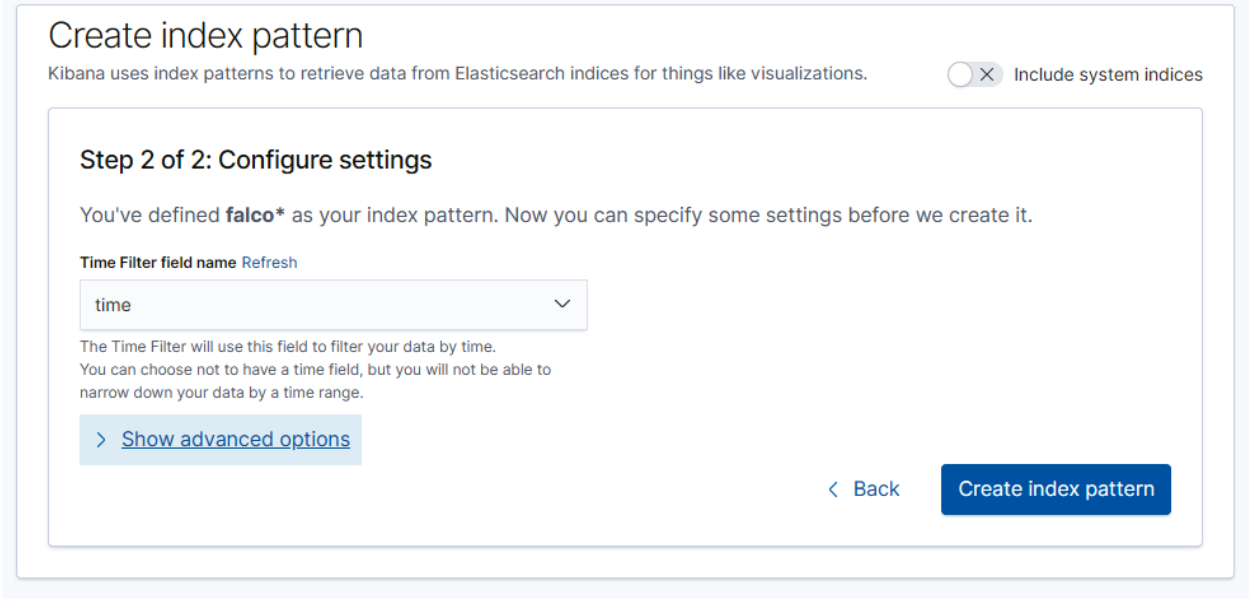
```
NAME                                                  TYPE        CLUSTER-IP
service/elasticsearch-elasticsearch-coordinating-only   ClusterIP   10.107.207.18
service/elasticsearch-elasticsearch-data              ClusterIP   10.109.103.120
service/elasticsearch-elasticsearch-master            ClusterIP   10.110.38.222
```

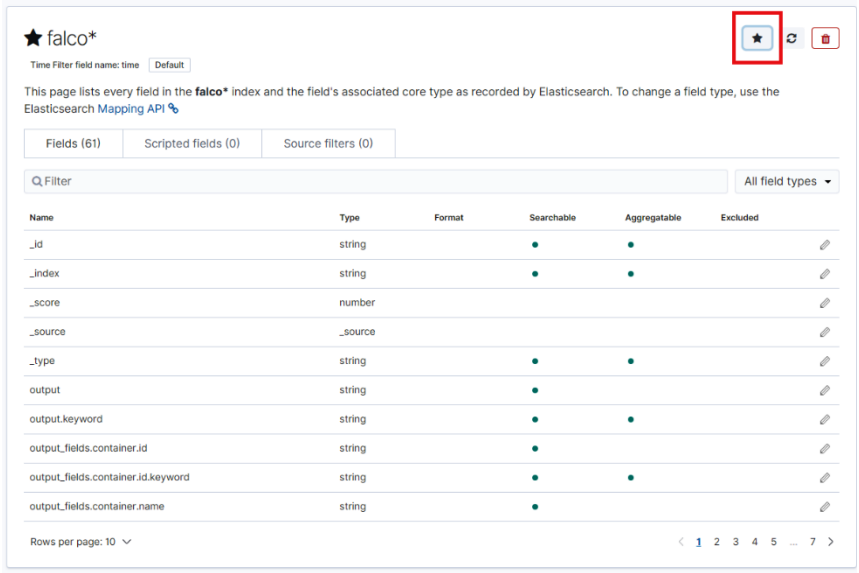
```
output.conf: |-
  <match **>
    @id elasticsearch
    @type elasticsearch
    @log_level info
    type_name _doc
    include_tag_key true
    host elasticsearch-elasticsearch-coordinating-only.logging.svc
    port 9200
    logstash_format true
```

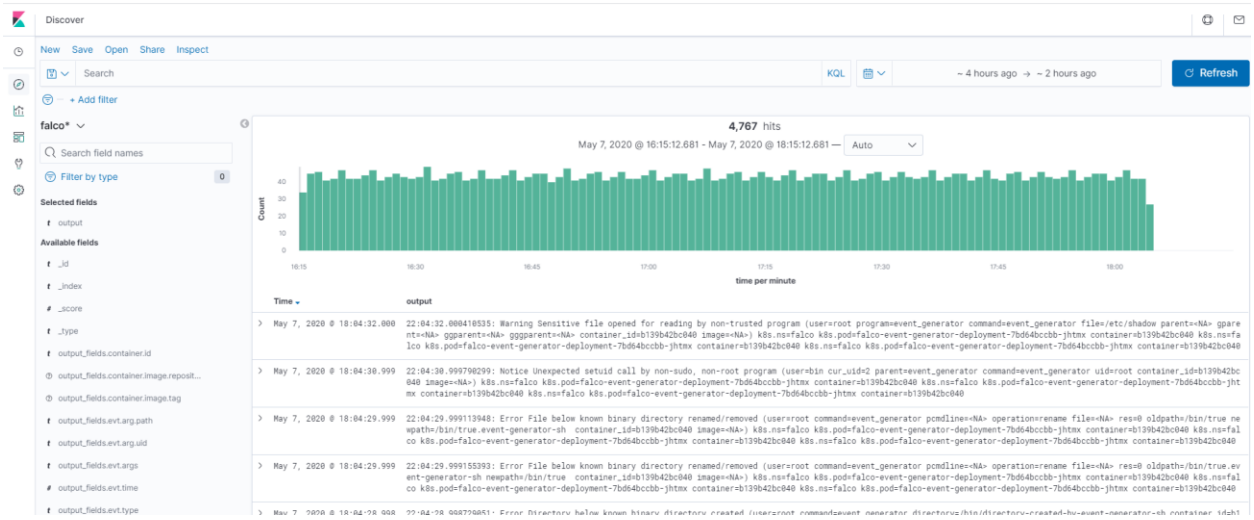
```
fluentd-es-v2.8.0-gxt8w          1/1     Running   0          79s
```

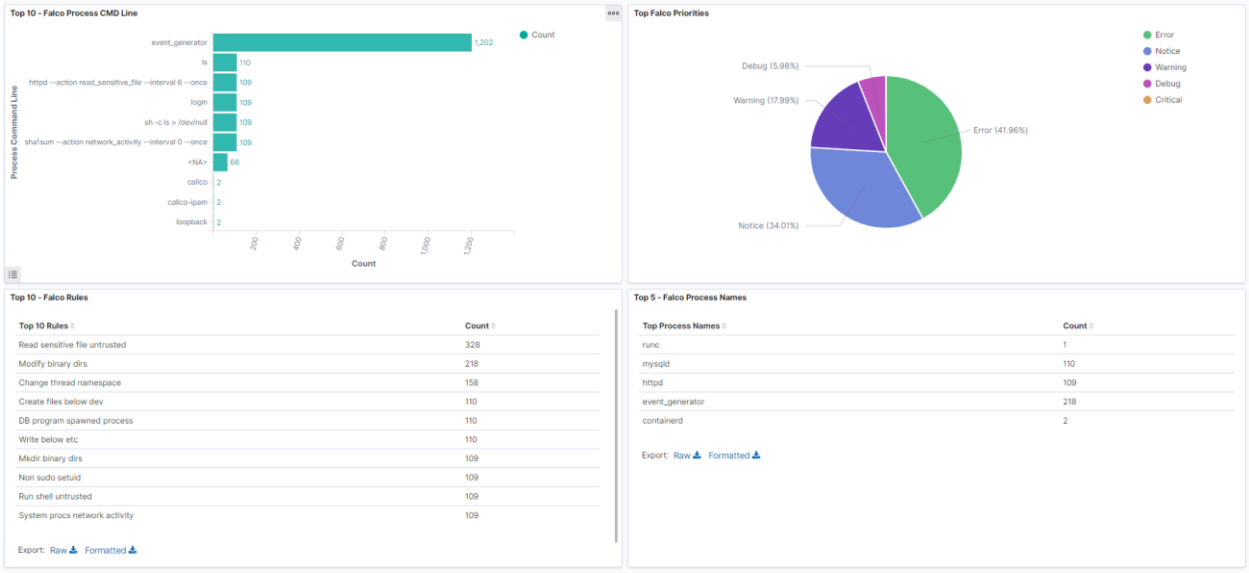



Create index pattern
Kibana uses index patterns to retrieve data from Elasticsearch indices for things like visualizations.
Include system indices
Step 1 of 2: Define index pattern
Index pattern
falco*
You can use a * as a wildcard in your index pattern.
You can't use spaces or the characters \, /, ?, ", <, >, |.
Next step
Success! Your index pattern matches 1 index.
falco-2020.05.07
Rows per page: 10


Create index pattern
Kibana uses index patterns to retrieve data from Elasticsearch indices for things like visualizations.
Include system indices
Step 2 of 2: Configure settings
You've defined falco* as your index pattern. Now you can specify some settings before we create it.
Time Filter field name Refresh
time
The Time Filter will use this field to filter your data by time.
You can choose not to have a time field, but you will not be able to narrow down your data by a time range.
Show advanced options
Back
Create index pattern


falco*
Time Filter field name: time
Default
This page lists every field in the falco* index and the field's associated core type as recorded by Elasticsearch. To change a field type, use the Elasticsearch Mapping API
Fields (61)
Scripted fields (0)
Source filters (0)
Filter
All field types
Name
Type
Format
Searchable
Aggregatable
Excluded
_id string
_index string
_score number
_source _source
_type string
output string
output.keyword string
output_fields.container.id string
output_fields.container.id.keyword string
output_fields.container.name string
Rows per page: 10
1 2 3 4 5 ... 7


Discover
New Save Open Share Inspect
Search
KQL
~ 4 hours ago → ~ 2 hours ago
Refresh
+ Add filter
falco*
Search field names
Filter by type
Selected fields
output
Available fields
_id
_index
_score
_type
output_fields.container.id
output_fields.container.image.reposit...
output_fields.container.image.tag
output_fields.evt.arg.path
output_fields.evt.arg.uid
output_fields.evt.args
output_fields.evt.time
output_fields.evt.type
4,767 hits
May 7, 2020 @ 16:15:12.681 - May 7, 2020 @ 18:15:12.681 —
Auto
Count
time per minute
Time
output
May 7, 2020 @ 18:04:32.000
May 7, 2020 @ 18:04:30.999
May 7, 2020 @ 18:04:29.999
May 7, 2020 @ 18:04:29.999



New Visualization

Filter

Area
Controls
Coordinate Map
Data Table
Gauge
Goal
Heat Map
Horizontal Bar
Line
Markdown
Metric
Pie
Region Map
TSVB
Tag Cloud
Timelion
Vega
Vertical Bar

Select a visualization type

Start creating your visualization by selecting a type for that visualization.

New Pie / Choose a source

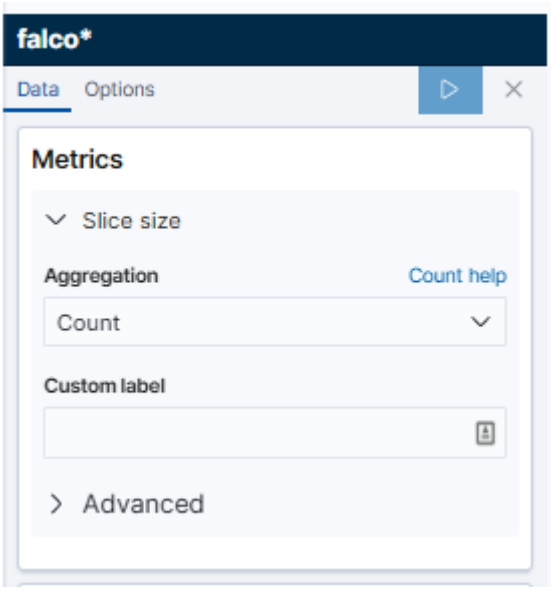
Search...

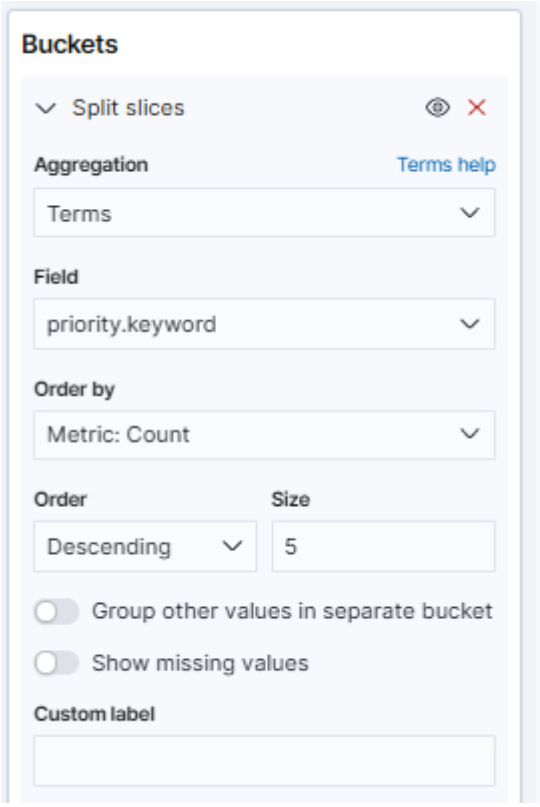
Sort

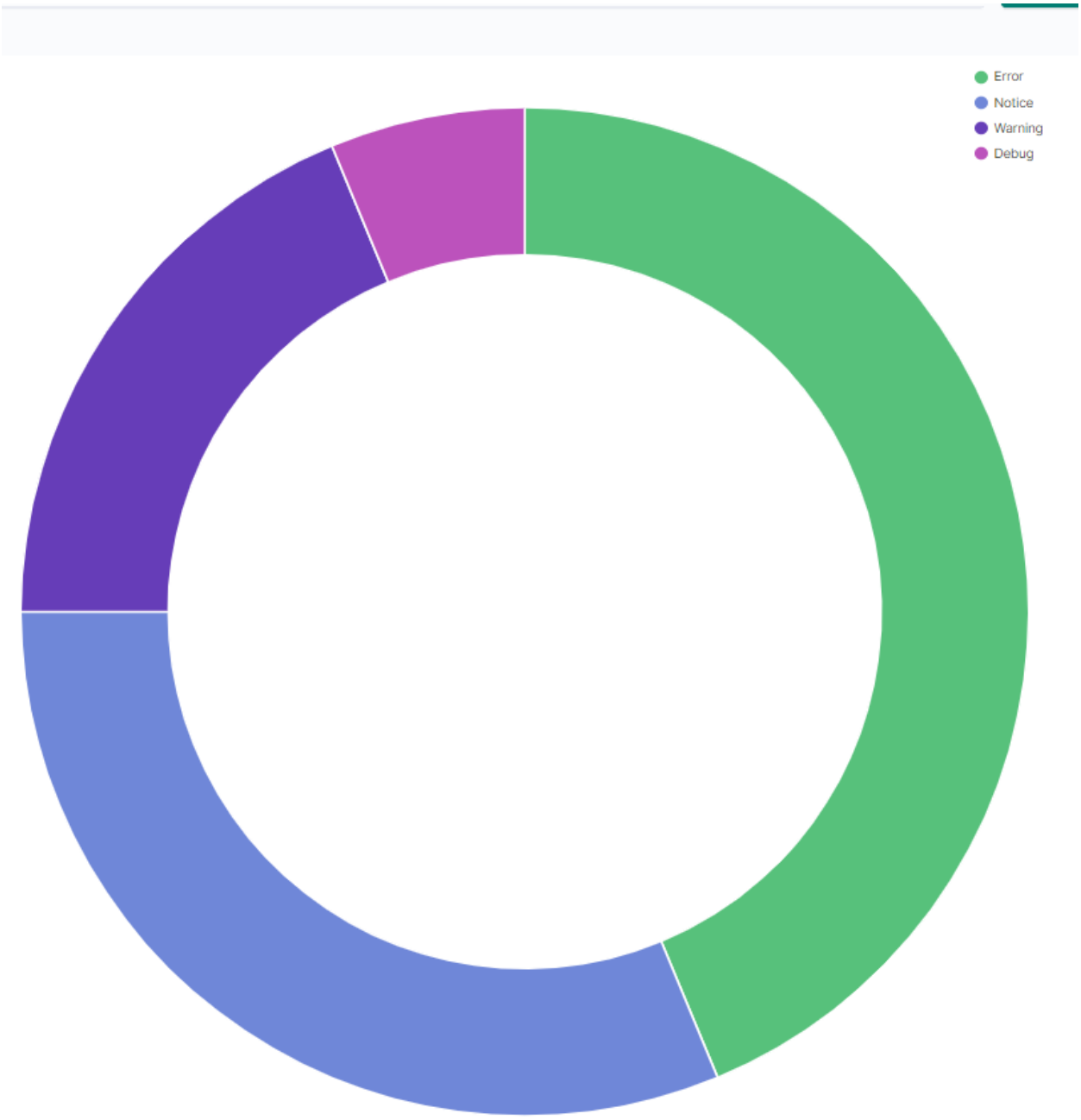
Types 2

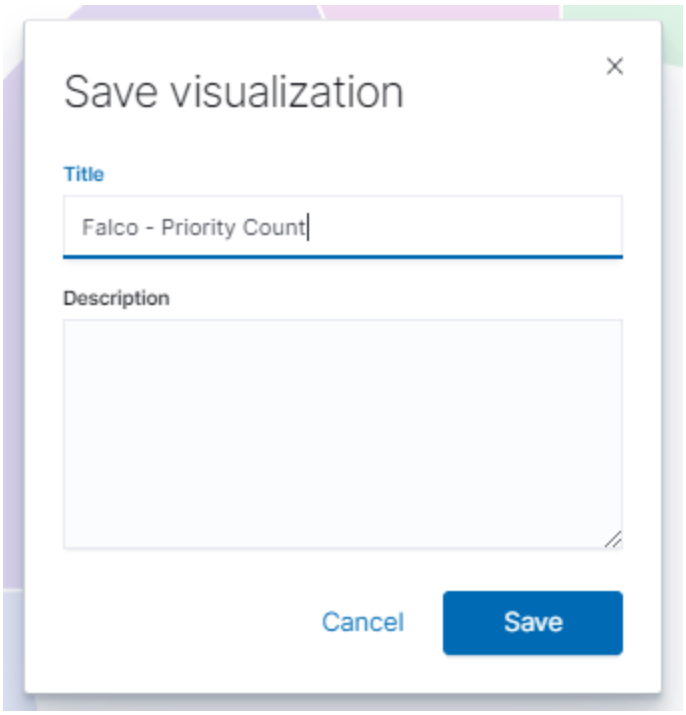
Falco Alerts

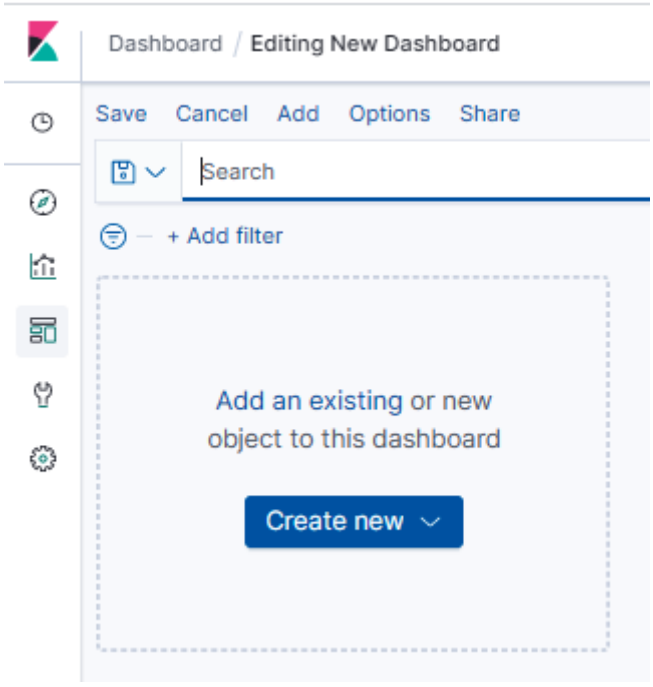
falco*

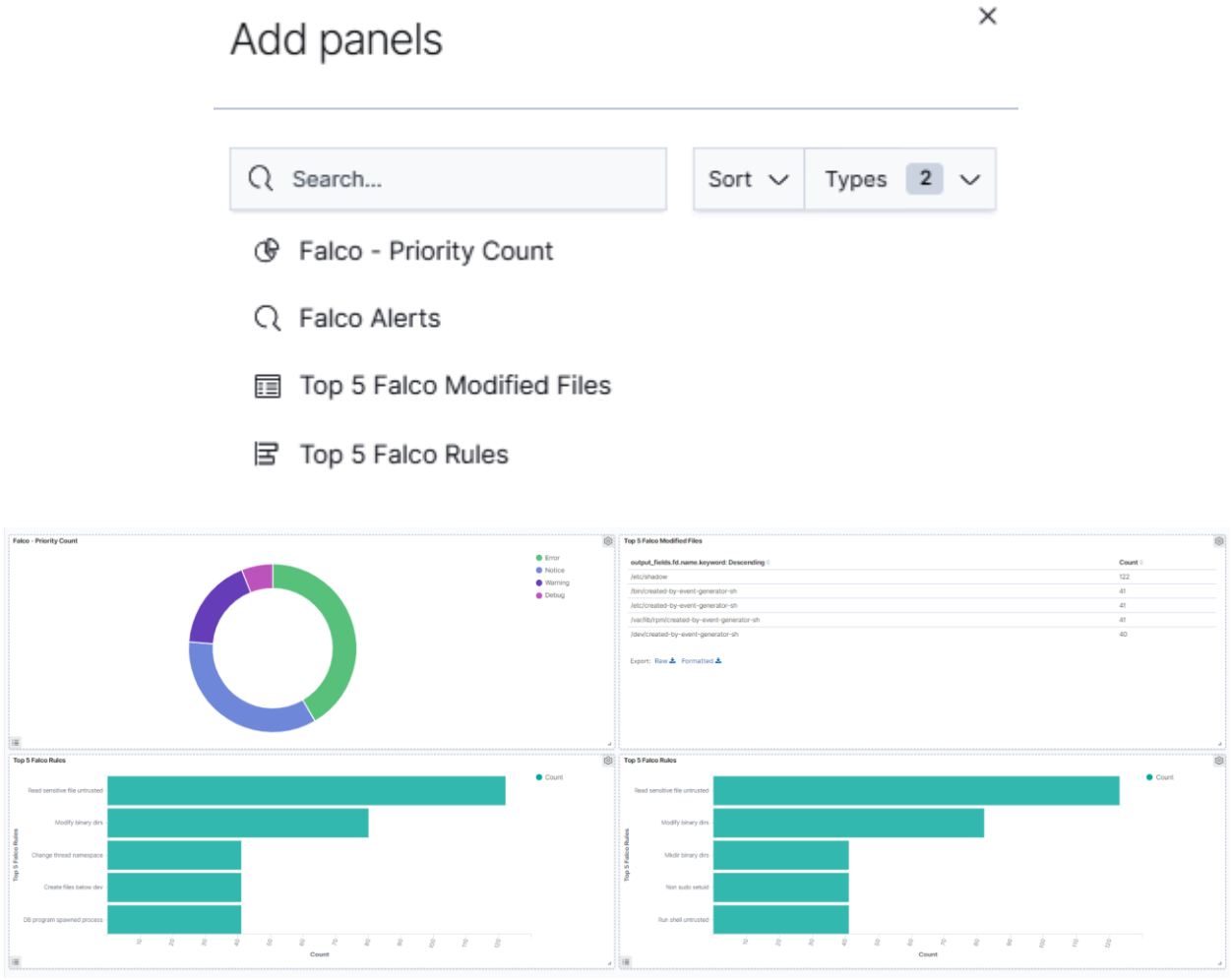


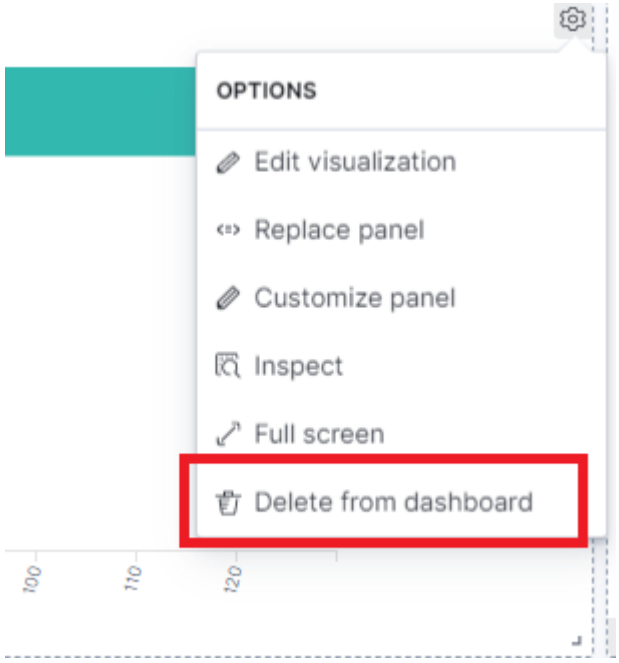

Buckets
Split slices
Aggregation
Terms help
Terms
Field
priority.keyword
Order by
Metric: Count
Order
Size
Descending
5
Group other values in separate bucket
Show missing values
Custom label

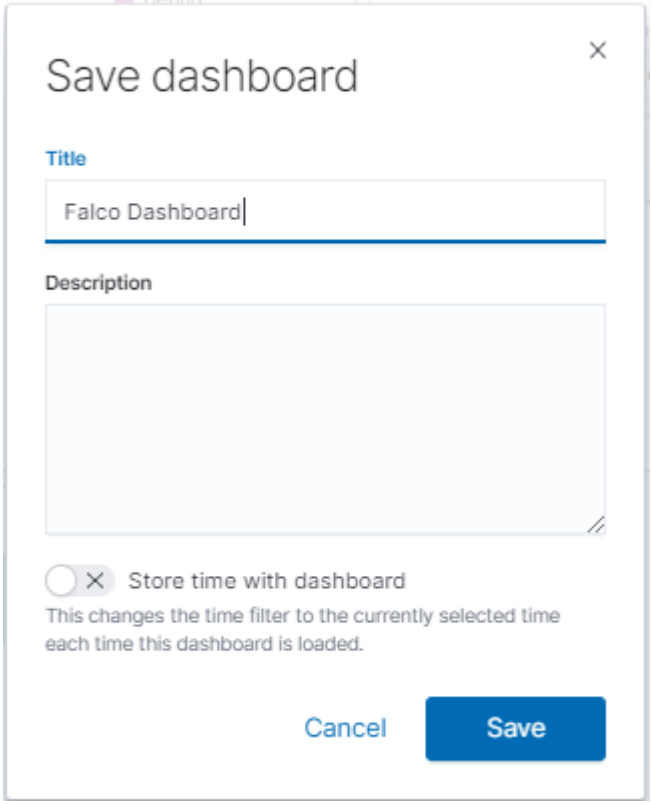

Error
Notice
Warning
Debug


Save visualization
Title
Falco - Priority Count
Description
Cancel
Save


Dashboard / Editing New Dashboard
Save
Cancel
Add
Options
Share
Search
+ Add filter
Add an existing or new object to this dashboard
Create new


Add panels
Search...
Sort
Types
2
Falco - Priority Count
Falco Alerts
Top 5 Falco Modified Files
Top 5 Falco Rules

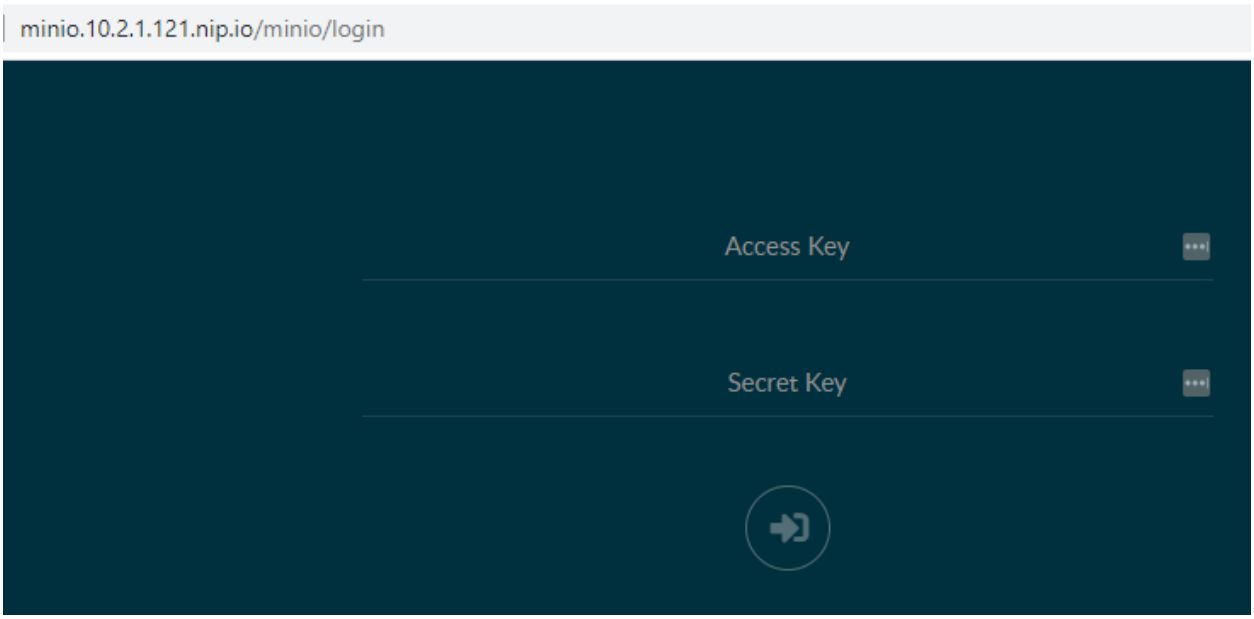

OPTIONS
Edit visualization
Replace panel
Customize panel
Inspect
Full screen
Delete from dashboard

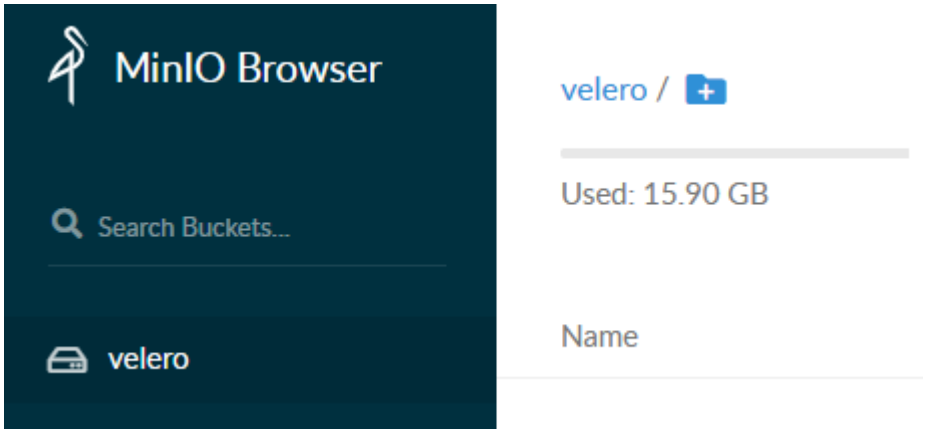

Save dashboard
Title
Falco Dashboard
Description
Store time with dashboard
This changes the time filter to the currently selected time each time this dashboard is loaded.
Cancel
Save

Chapter 13: Backing Up Workloads

```
Client:
        Version: v1.4.0
        Git commit: 5963650c9d64643daaf510ef93ac4a36b6483392
<error getting server version: the server could not find the requested resource (post serverstatusrequests.velero.io)>
```

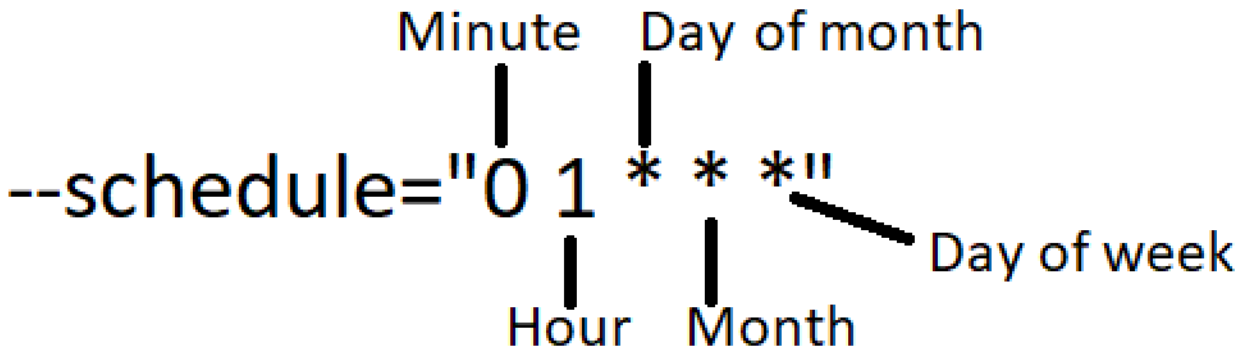
```
NAME    TYPE        CLUSTER-IP      EXTERNAL-IP   PORT(S)    AGE
minio   ClusterIP   10.108.125.224  <none>        9000/TCP   16d
```





```
Name:         initial-backup
Namespace:    velero
Labels:       velero.io/storage-location=default
Annotations:  velero.io/source-cluster-k8s-gitversion=v1.18.2
              velero.io/source-cluster-k8s-major-version=1
              velero.io/source-cluster-k8s-minor-version=18

Phase:  Completed

Namespaces:
  Included:  *
  Excluded:  <none>

Resources:
  Included:        *
  Excluded:        <none>
  Cluster-scoped:  auto

Label selector:  <none>

Storage Location:  default

Velero-Native Snapshot PVs:  auto

TTL:  720h0m0s

Hooks:  <none>

Backup Format Version:  1

Started:    2020-06-27 16:49:54 +0000 UTC
Completed:  2020-06-27 16:50:01 +0000 UTC

Expiration:  2020-07-27 16:49:54 +0000 UTC

Total items to be backed up:  384
Items backed up:              384

Velero-Native Snapshots: <none included>
```

```
Spec:
  Hooks:
  Included Namespaces:
    *
  Storage Location:  default
  Ttl:               720h0m0s
Status:
  Completion Timestamp:  2020-06-27T16:50:01Z
  Expiration:            2020-07-27T16:49:54Z
  Format Version:        1.1.0
  Phase:                 Completed
  Progress:
    Items Backed Up:  384
    Total Items:      384
  Start Timestamp:    2020-06-27T16:49:54Z
  Version:            1
```




```
Create a backup

Usage:
  velero backup create NAME [flags]

Examples:
        # create a backup containing all resources
        velero backup create backup1

        # create a backup including only the nginx namespace
        velero backup create nginx-backup --include-namespaces nginx

        # create a backup excluding the velero and default namespaces
        velero backup create backup2 --exclude-namespaces velero,default

        # view the YAML for a backup that doesn't snapshot volumes, without sending it to the
 server
        velero backup create backup3 --snapshot-volumes=false -o yaml

        # wait for a backup to complete before returning from the command
        velero backup create backup4 --wait

Flags:
      --exclude-namespaces stringArray                namespaces to exclude from the backup
      --exclude-resources stringArray                 resources to exclude from the backup,
```

```
NAME                                STATUS      CREATED
backup-initial                      Completed   2020-06-27 04:24:38 +0000 UTC
cluster-daily-20200627175009        Completed   2020-06-27 17:50:09 +0000 UTC
cluster-daily-20200627174947        Completed   2020-06-27 17:49:47 +0000 UTC
cluster-ns-daily-20200627180800     Completed   2020-06-27 18:08:00 +0000 UTC
day2                                Completed   2020-06-27 04:25:59 +0000 UTC
initial-backup                      Completed   2020-06-27 16:49:54 +0000 UTC
selector-example                    Completed   2020-06-27 18:00:03 +0000 UTC
selector-example2                   Completed   2020-06-27 18:00:54 +0000 UTC
```

```
Are you sure you want to continue (Y/N)? y
Request to delete backup "day2" submitted successfully.
The backup will be fully deleted after all associated data (disk snapshots, backup files, restores) are removed.
```

nginx-lab.10.2.1.121.nip.io

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

nginx-lab.10.2.1.121.nip.io

404 Not Found

nginx/1.17.7

nginx-lab.10.2.1.121.nip.io

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.

```
CURRENT   NAME                 CLUSTER              AUTHINFO             NAMESPACE
          kind-cluster01       kind-cluster01       kind-cluster01
*         kind-velero-restore  kind-velero-restore  kind-velero-restore
```

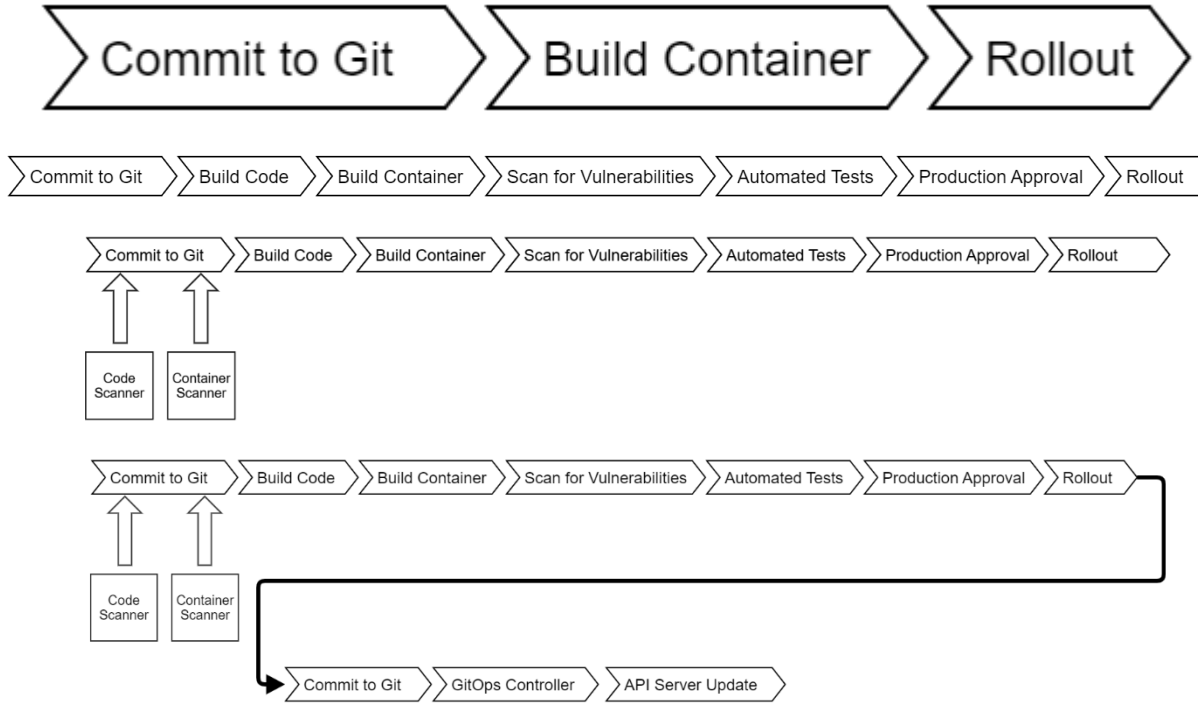
```
NAME                   STATUS   AGE
default                Active   5m42s
kube-node-lease        Active   5m44s
kube-public            Active   5m44s
kube-system            Active   5m44s
local-path-storage     Active   5m36s
```

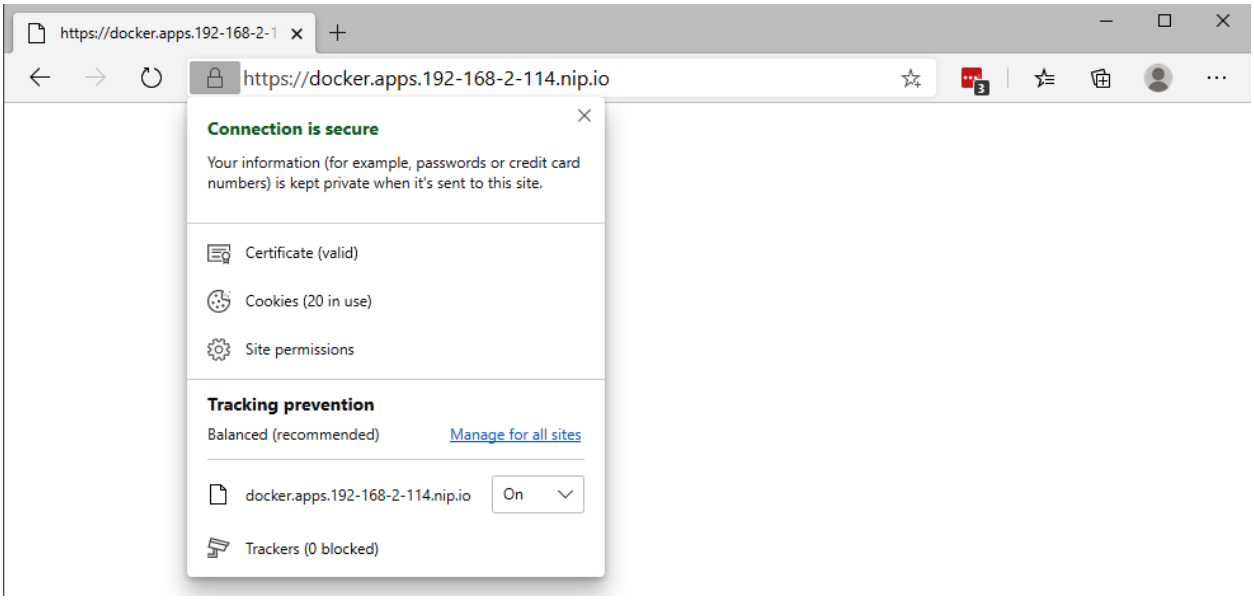
```
NAME                                STATUS      CREATED                         EXPIRES
backup-initial                      Completed   2020-06-27 04:24:38 +0000 UTC   29d
cluster-daily-20200627175009        Completed   2020-06-27 17:50:09 +0000 UTC   29d
cluster-daily-20200627174947        Completed   2020-06-27 17:49:47 +0000 UTC   29d
cluster-full-demo                   Completed   2020-06-27 21:53:24 +0000 UTC   29d
```

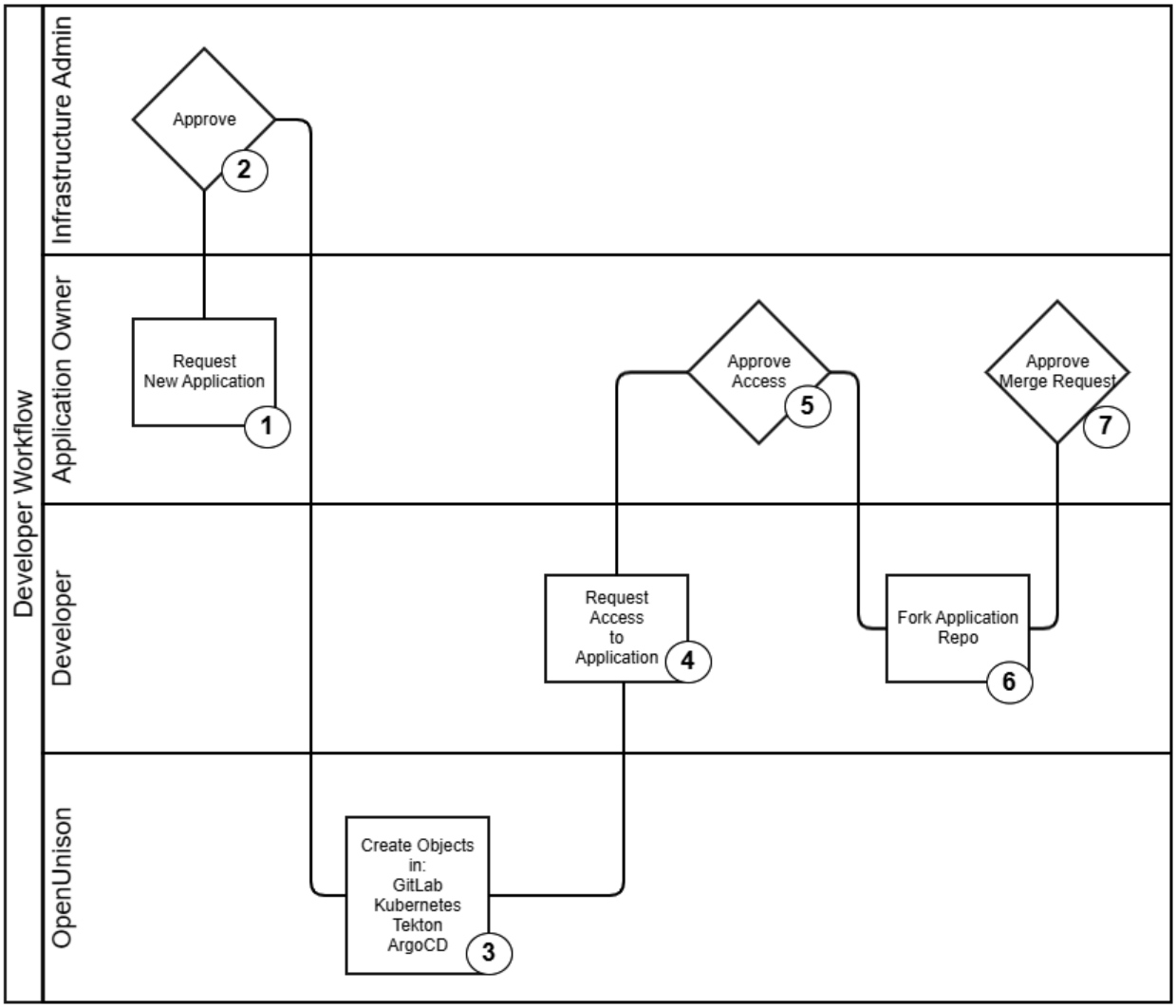
```
NAME                   STATUS   AGE
default                Active   38m
demo1                  Active   119s
demo2                  Active   119s
demo3                  Active   118s
demo4                  Active   118s
ingress-nginx          Active   11m
kube-node-lease        Active   38m
kube-public            Active   38m
kube-system            Active   38m
local-path-storage     Active   38m
nginx-lab              Active   11m
velero                 Active   24m
```

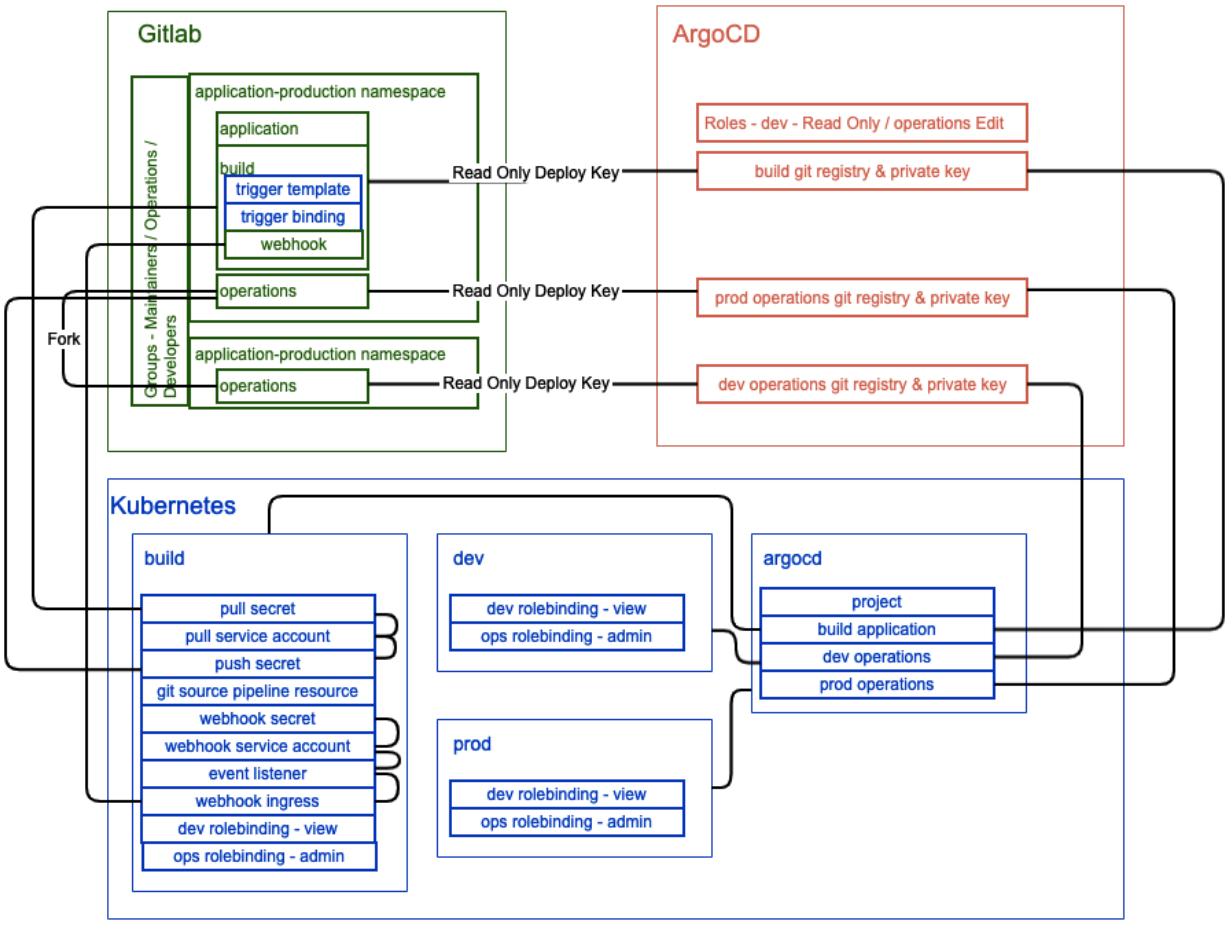
```
NAME    READY   STATUS    RESTARTS   AGE
nginx   1/1     Running   0          2m13s
```

Chapter 14: Provisioning a Platform






Developer Workflow
Infrastructure Admin
Application Owner
Developer
OpenUnison
Approve
2
Request
New Application
1
Approve
Access
5
Approve
Merge Request
7
Request
Access
to
Application
4
Fork Application
Repo
6
Create Objects
in:
GitLab
Kubernetes
Tekton
ArgoCD
3


Gitlab
ArgoCD
application-production namespace
application
build
trigger template
trigger binding
webhook
operations
application-production namespace
operations
Groups - Maintainers / Operations / Developers
Fork
Read Only Deploy Key
Read Only Deploy Key
Read Only Deploy Key
Roles - dev - Read Only / operations Edit
build git registry & private key
prod operations git registry & private key
dev operations git registry & private key
Kubernetes
build
pull secret
pull service account
push secret
git source pipeline resource
webhook secret
webhook service account
event listener
webhook ingress
dev rolebinding - view
ops rolebinding - admin
dev
dev rolebinding - view
ops rolebinding - admin
prod
dev rolebinding - view
ops rolebinding - admin
argocd
project
build application
dev operations
prod operations