

Introducing the Ingress API Object and Controller



Nigel Brown

@n_brownuk www.windsock.io



Module Outline



Introduce the Ingress concept and API

Discuss the nature of ingress controllers

Differentiate between host-based and path-based routing

Learn how to define ingress objects to route requests to backends

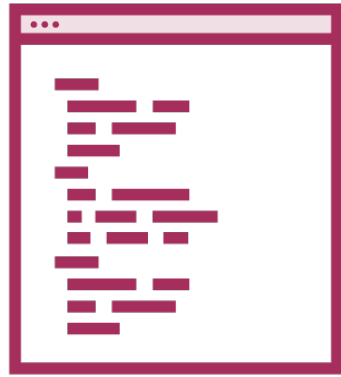


Ingress

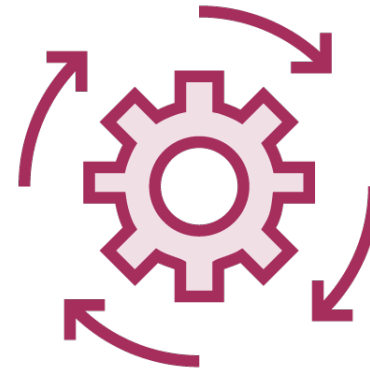
A Kubernetes API object that manages the routing of external HTTP/S traffic to services running in a cluster



Ingress Objects and Controllers

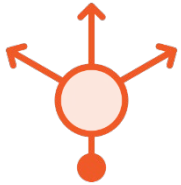


**Ingress Object
Definition**



**Ingress Controller
Deployment**

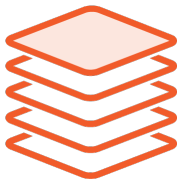
Why Third-party Controllers?



Part of the ingress controller's function, is to act as a reverse proxy for cluster workloads



Best of breed is subjective, instead we have the ability to choose a solution that works for us



Infrastructure providers can create ingress controllers optimized for their environments



Proxy-based Ingress Controllers

Nginx

Maintained by the k8s
community

<https://git.io/fh4UC>

Traefik

Based on a cloud
native edge router

<https://git.io/JfI6E>

Contour

Uses the popular
Envoy service proxy

<https://git.io/fh4Ua>



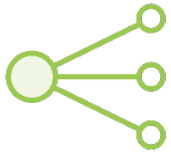
Characteristics of the Ingress API



Defines traffic routes between external clients and services



Allows encrypted communication using Transport Layer Security

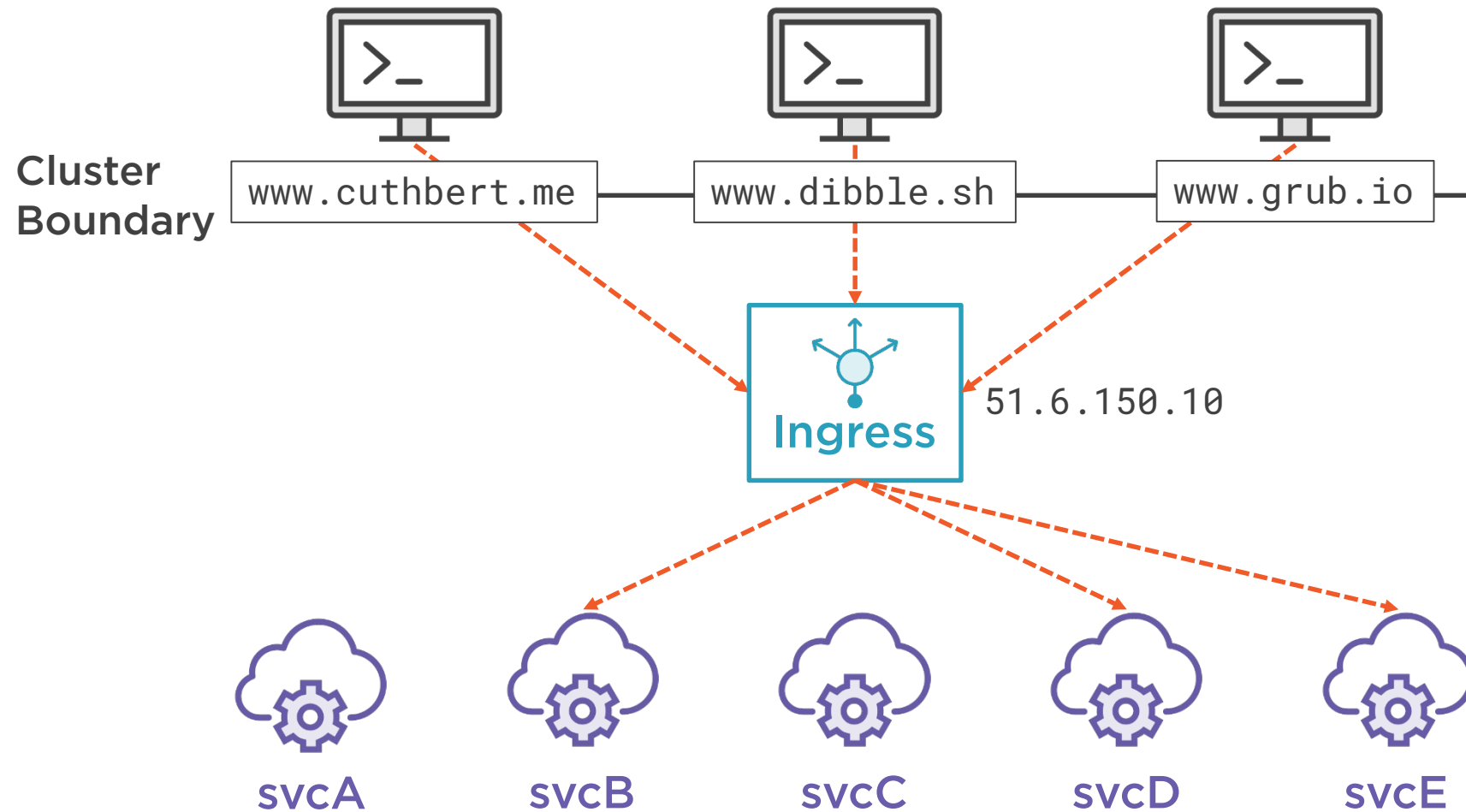


Load balances client traffic across a service's endpoints (pods)

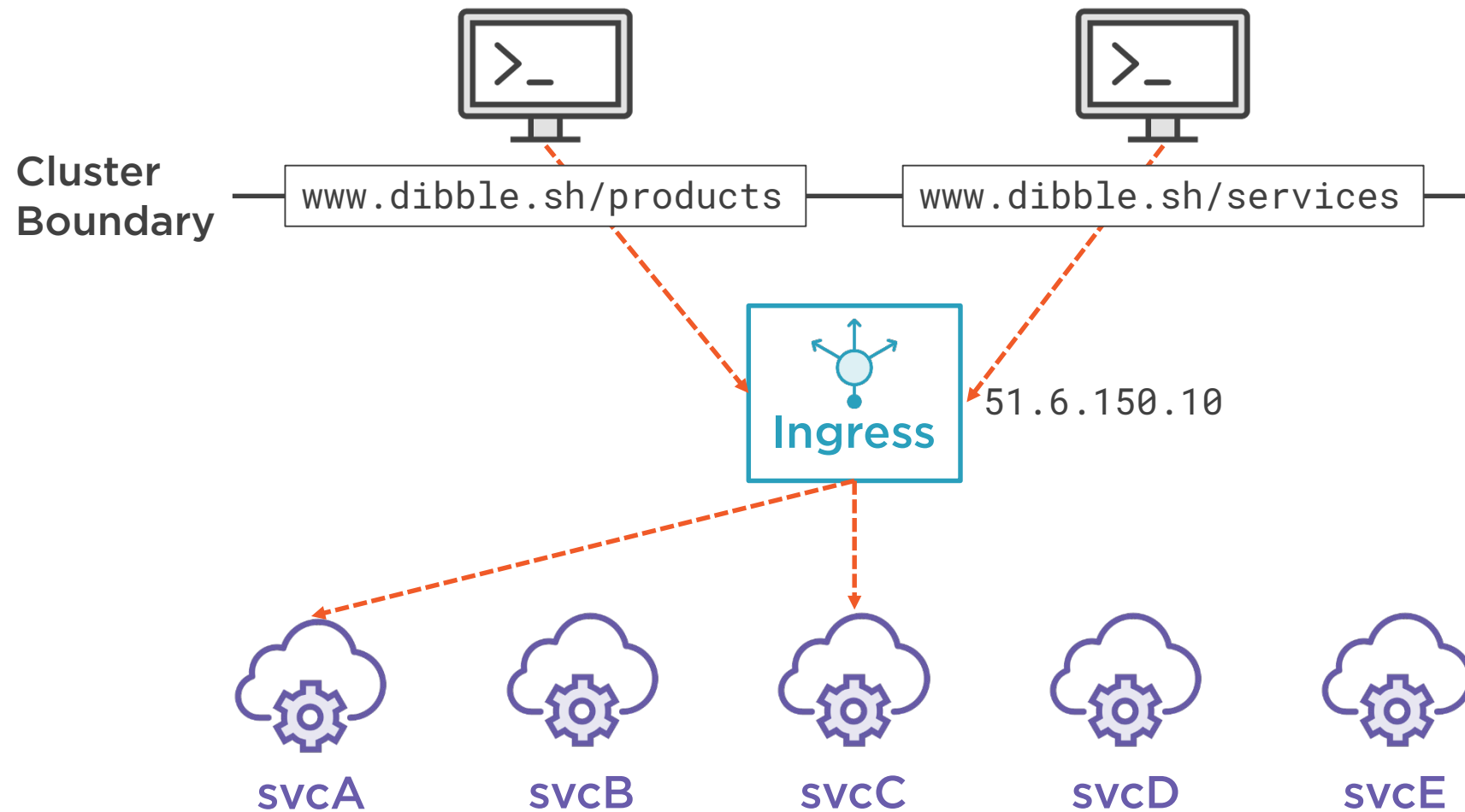


The Ingress API has remained largely static, and is likely to evolve

Name-based Virtual Hosts



Path-based Routing



Demo



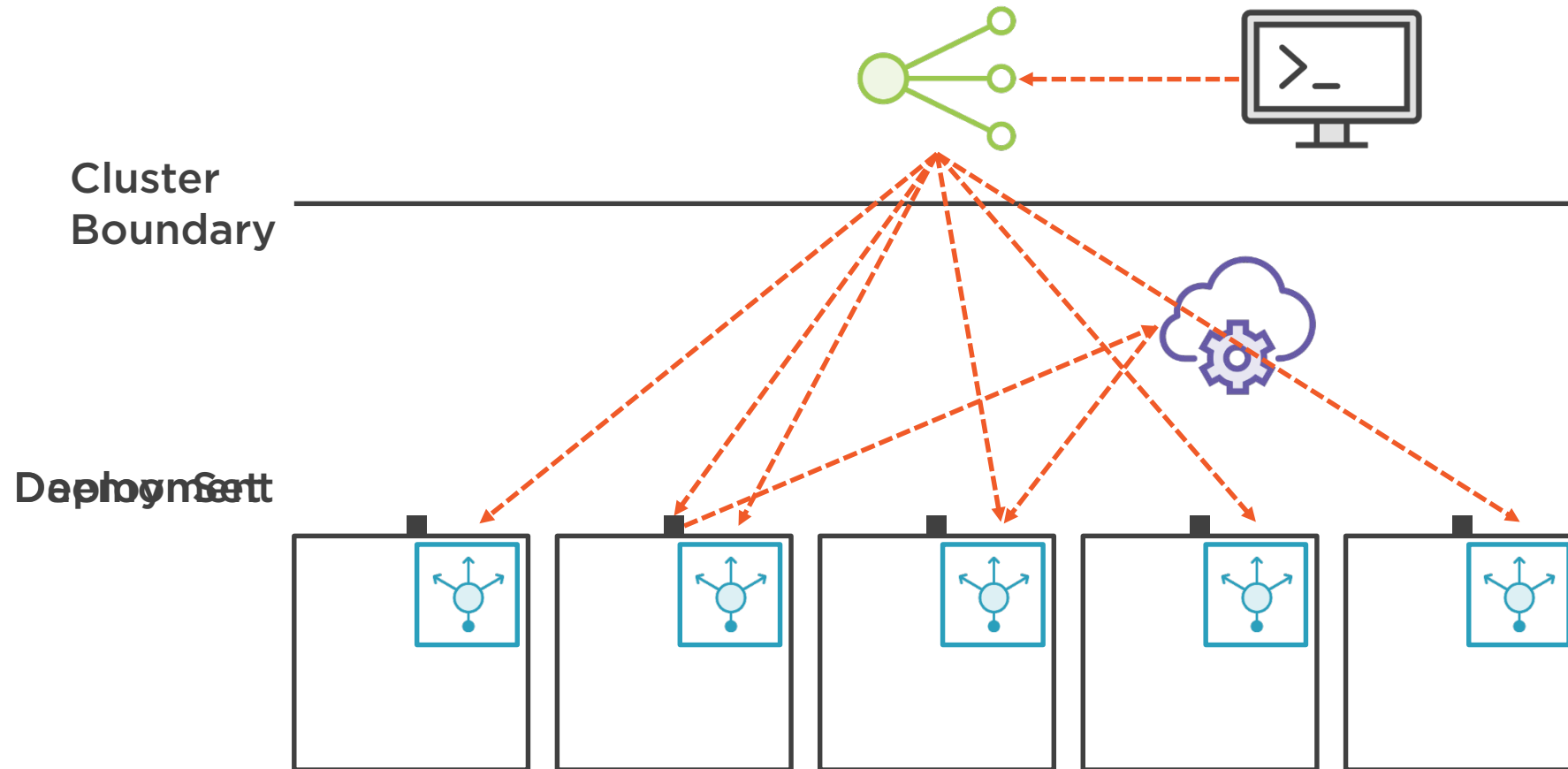
Discuss the available deployment options for ingress controllers

Deploy the open source Traefik ingress controller

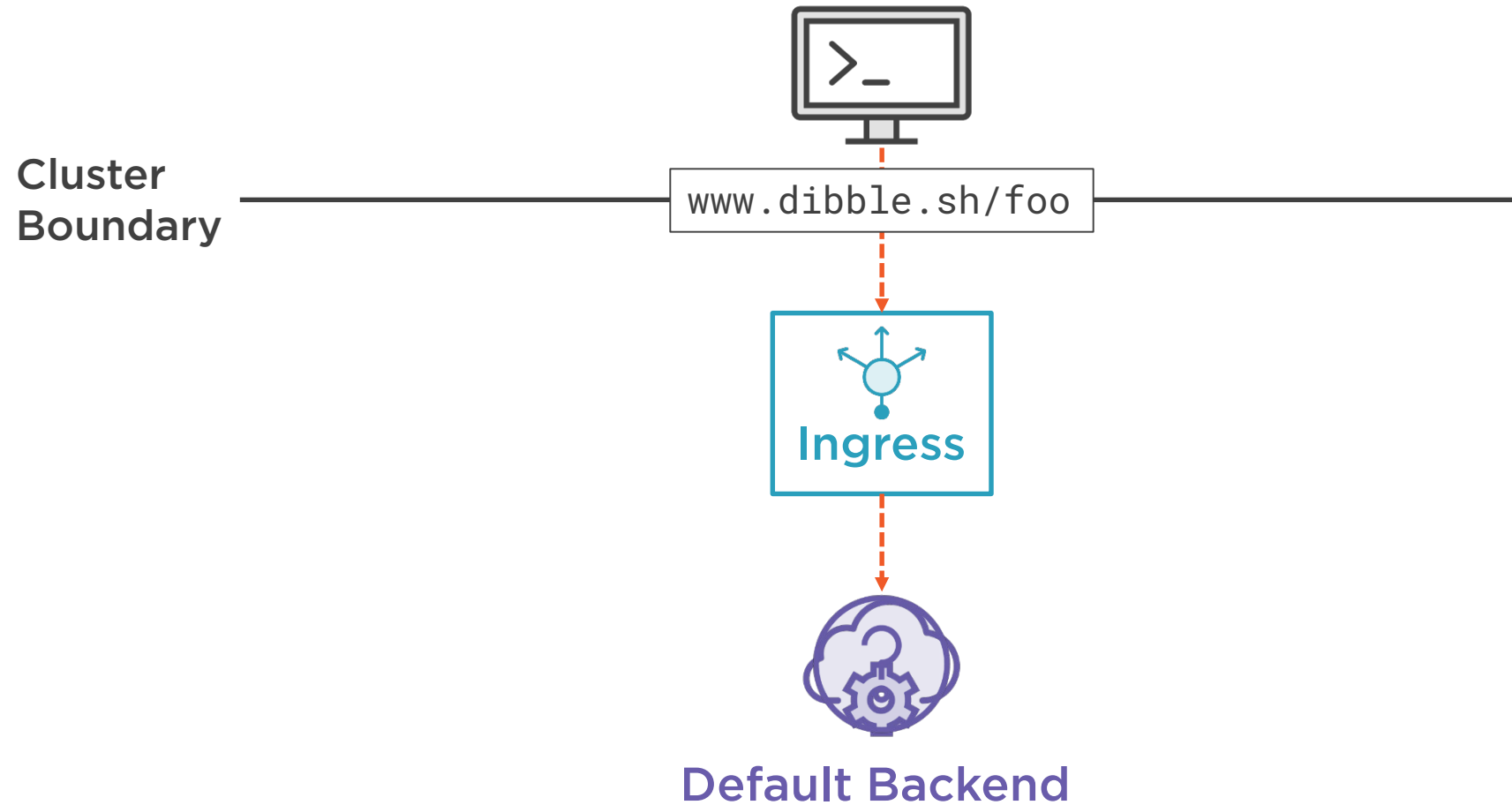
Inspect the API objects created in the cluster



Ingress Controller Deployment



Invalid Requests



```
apiVersion: networking.k8s.io/v1beta1
kind: Ingress
metadata:
  name: single-default-backend-ingress
```

Defining an Ingress API Object

An ingress object is defined using the Ingress resource kind



```
spec:  
  backend:  
    serviceName: default-backend-svc  
    servicePort: 8080
```

Defining a Default Backend Service

The backend field defines the default backend service



Limitations of the Default Backend Service



Perfect design for routing ingress traffic to a single backend service



Works with ingress definitions containing rules for HTTP requests



Not so good when there are multiple default backend definitions



Ingress controllers use different mechanisms for resolving the issue



```
# Community Nginx Ingress Controller  
--default-backend-service  
  
e.g. $(POD_NAMESPACE)/default-http-backend
```

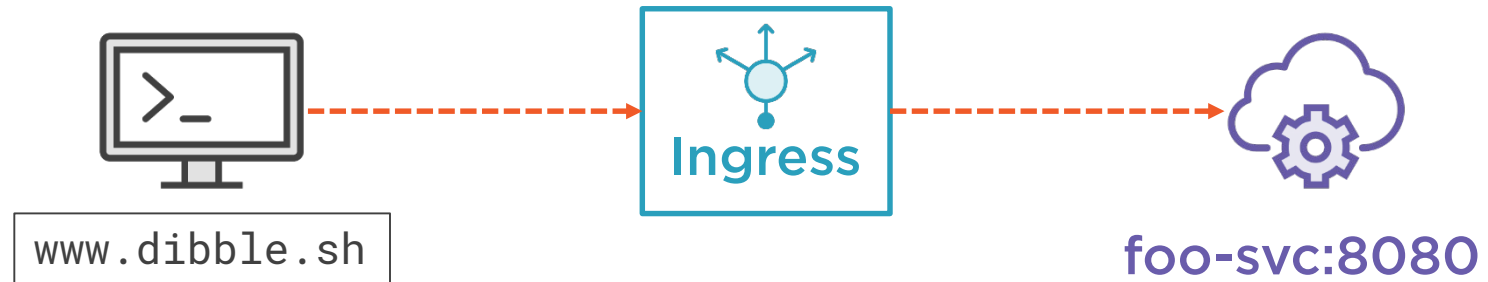
Configuring the Nginx Default Backend

The config option specifies the service and its namespace

A custom default backend service can be configured to suit you



Host Rule Routing



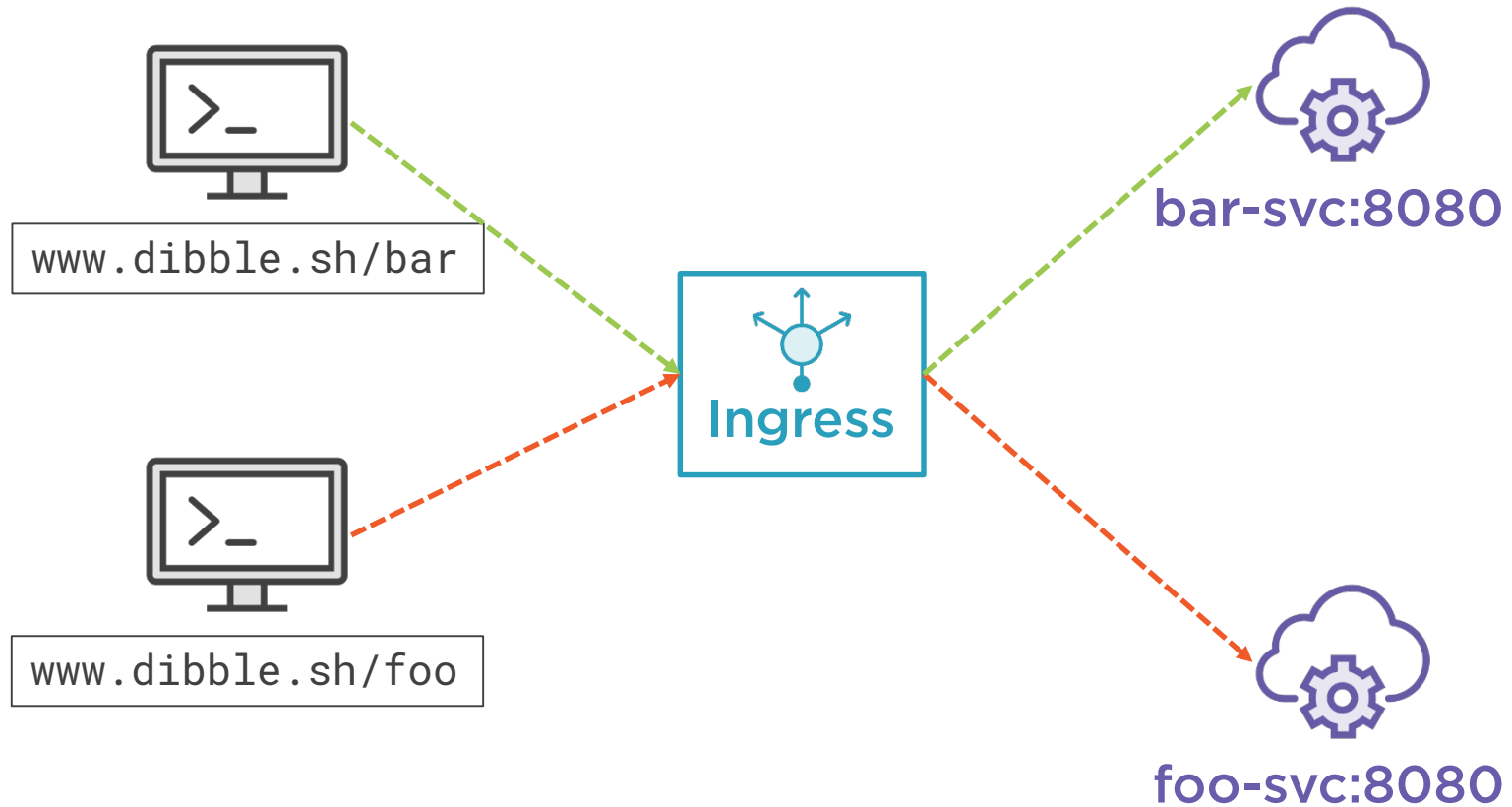
```
spec:
  rules:
  - host: www.dibble.sh
    http:
      paths:
      - backend:
          serviceName: foo-svc
          servicePort: 8080
```

Ingress Host Rule

A host rule requires a host field and a list of HTTP paths



Path Rule Routing



```
spec:
  rules:
  - http:
      paths:
      - path: /foo
        backend:
          serviceName: foo-svc
          servicePort: 8080
      - path: /bar
        backend:
          serviceName: bar-svc
          servicePort: 8080
```

◀ Path field specifies the required path of the URL request

◀ Additional paths can be added to the list



Path Rule Considerations



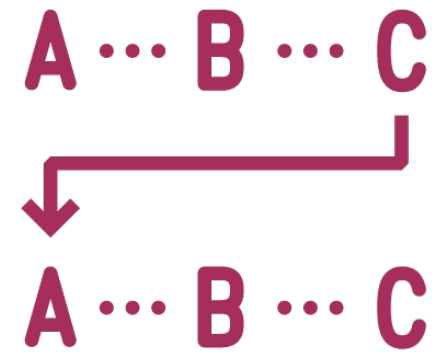
Regex

Paths are expressed as extended POSIX regex



Rewrite

Request paths may need to be rewritten



Priority

It may be necessary to prioritize paths

Demo



Define and deploy an ingress for default backend service

Create an ingress object for host-based routing

Reconfigure the ingress object for path-based routing



Module Summary



The Ingress API allows us to define routes for ingress traffic

Ingress controllers fulfil the routing defined in Ingress objects

Default backends help to manage the response to invalid requests

