Managing Service Traffic

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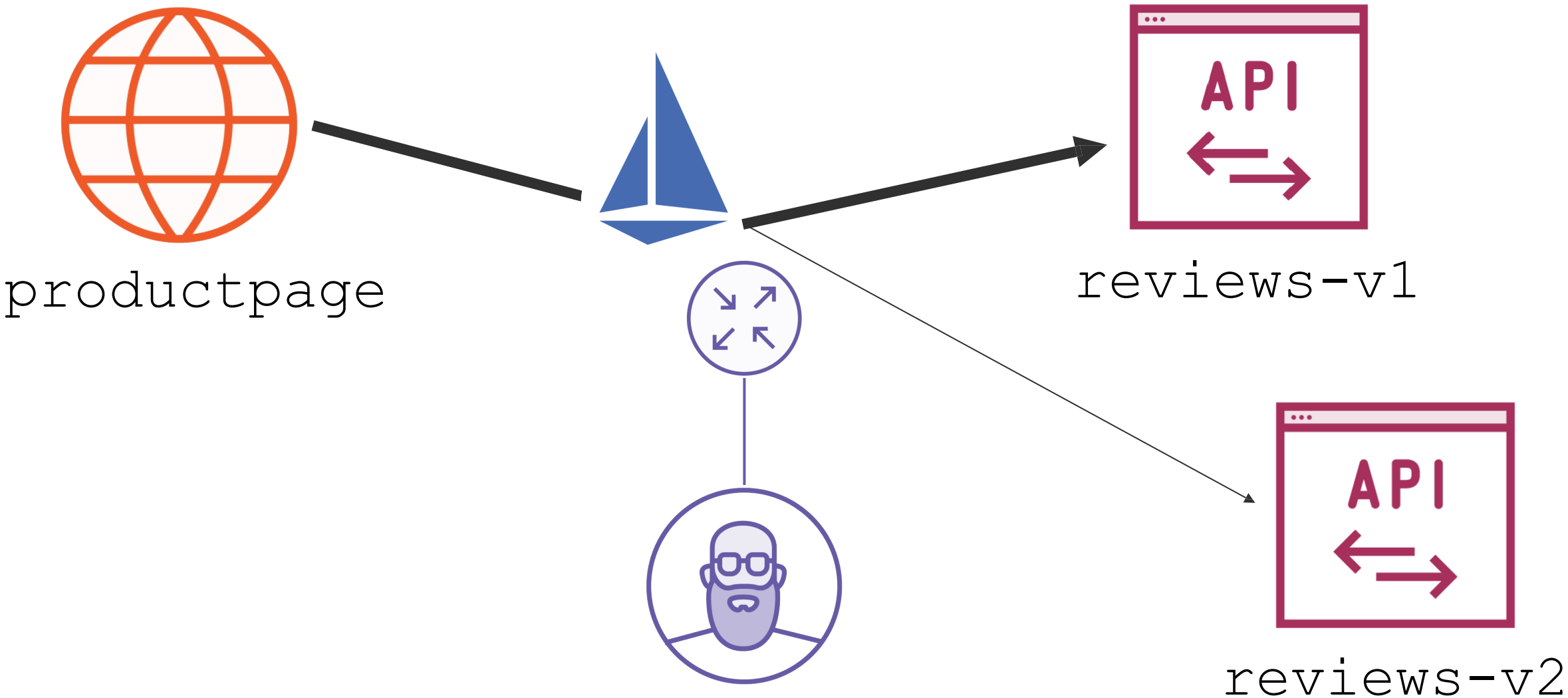
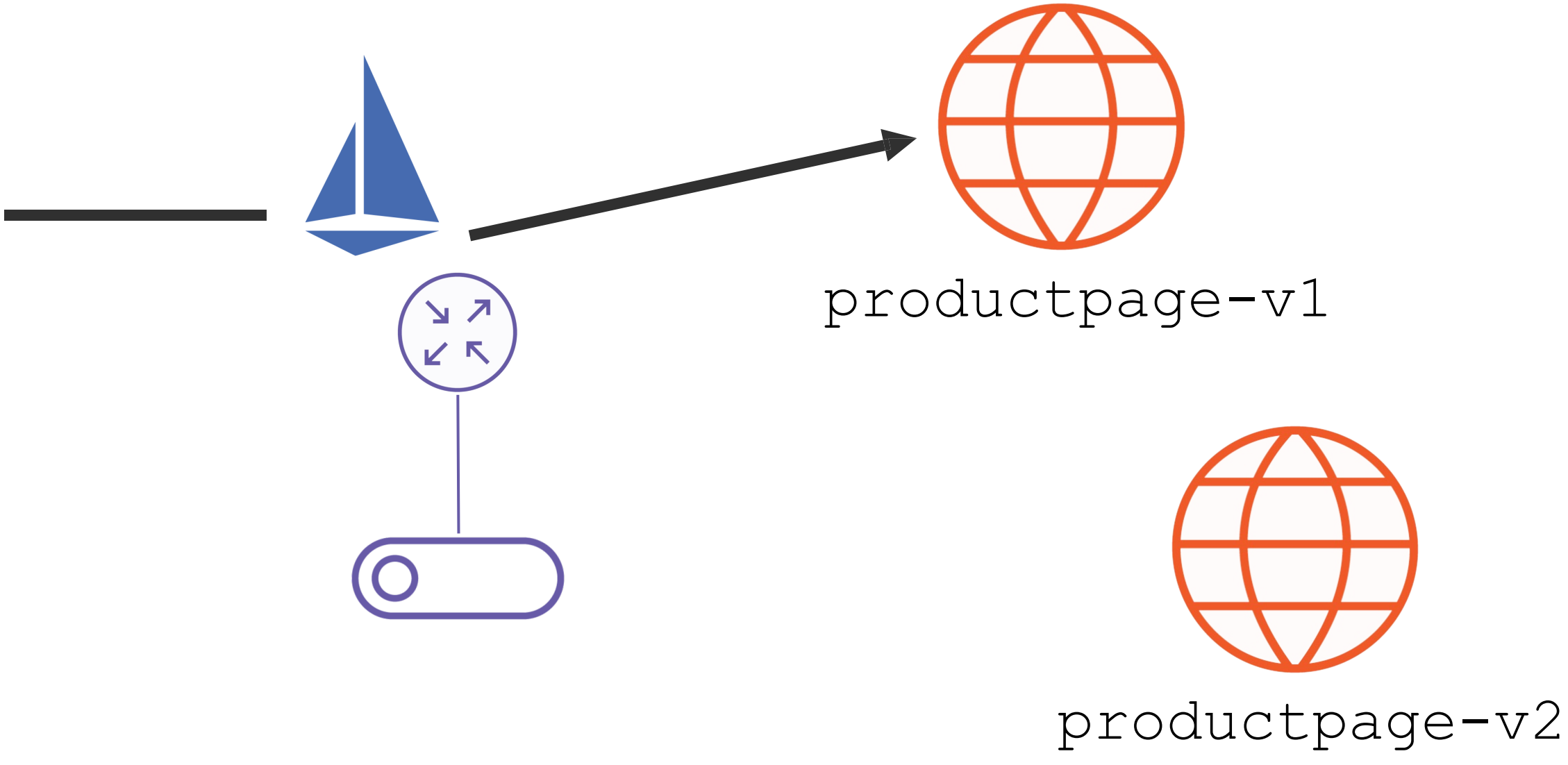
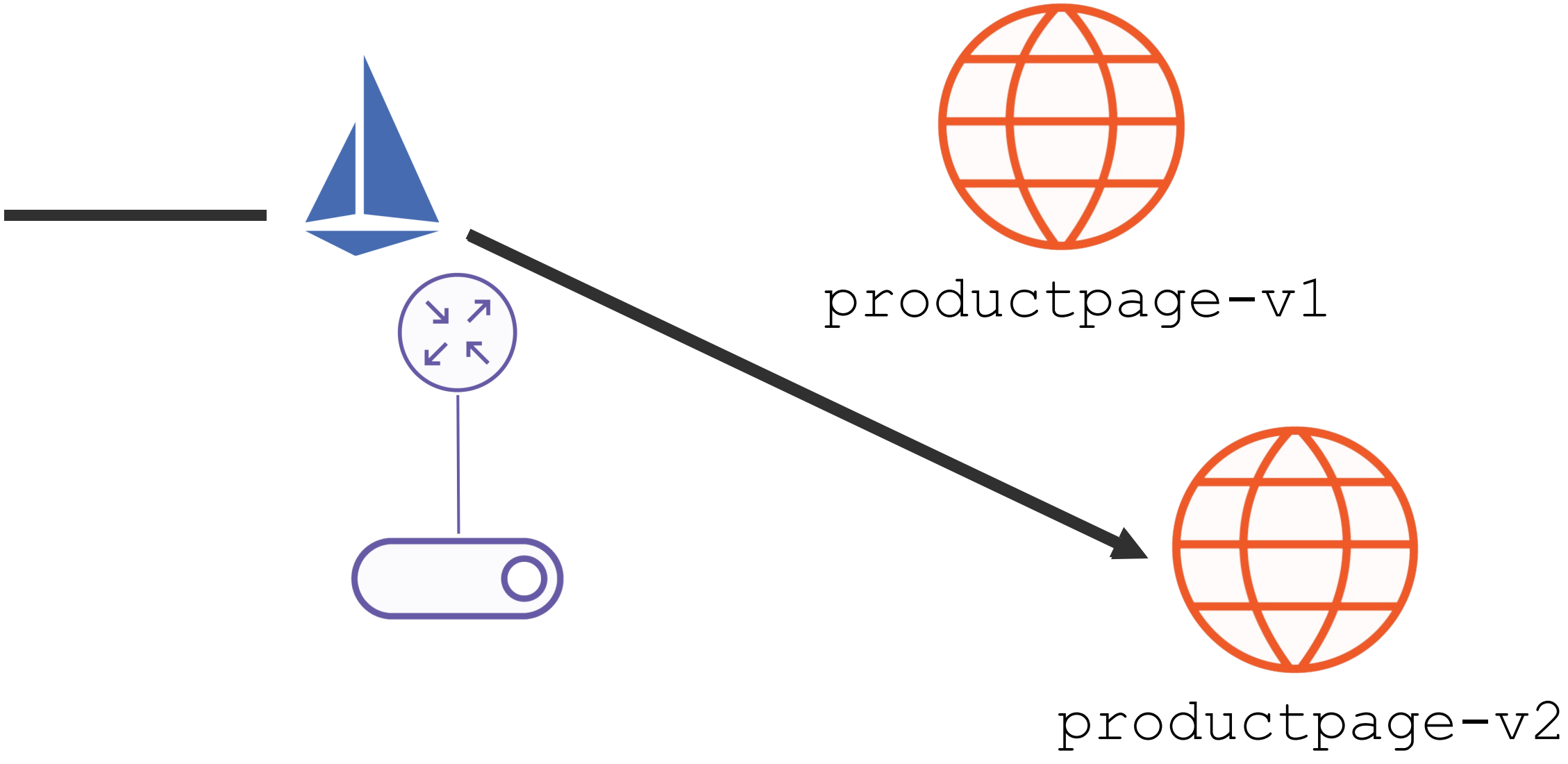
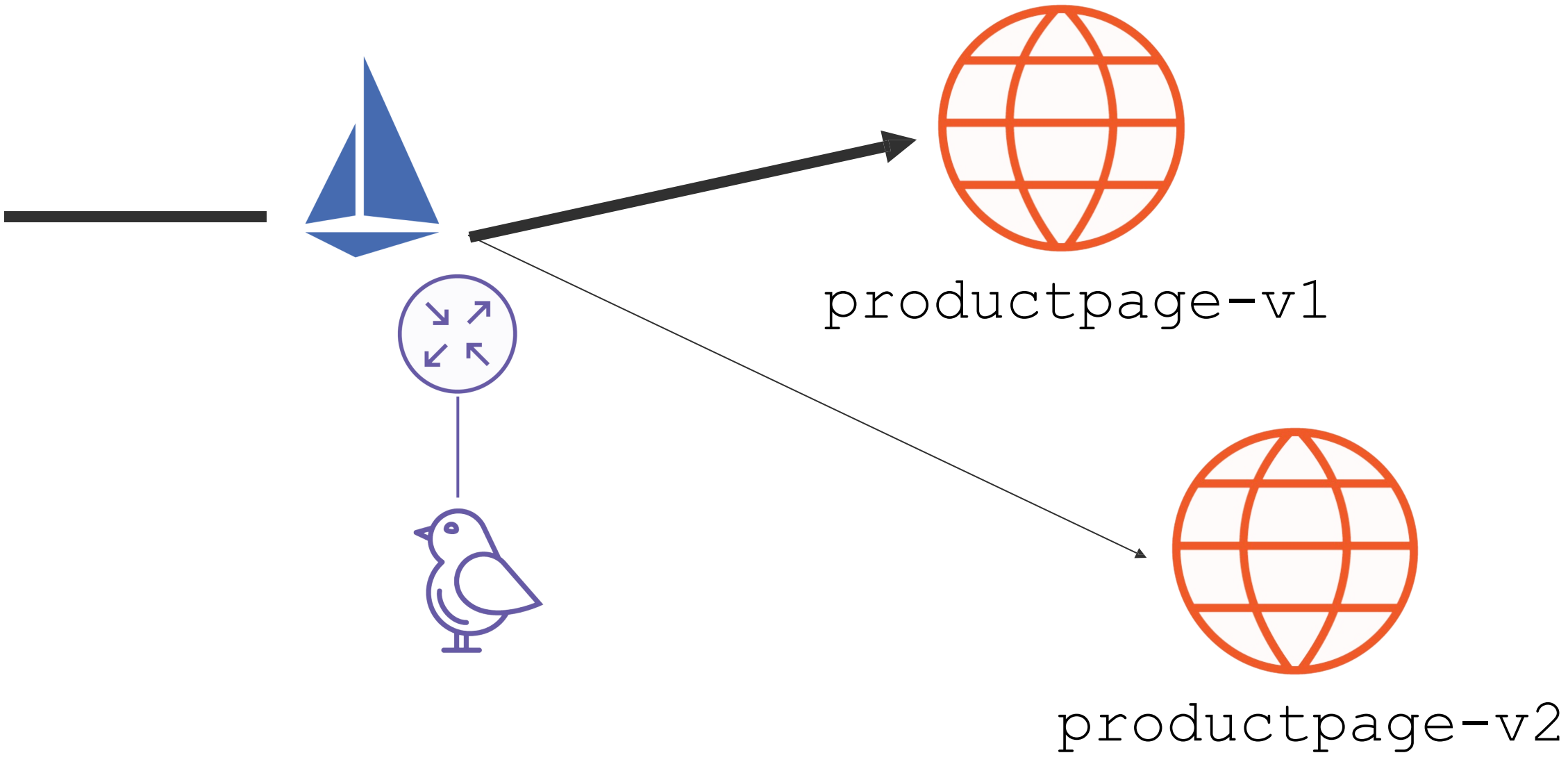
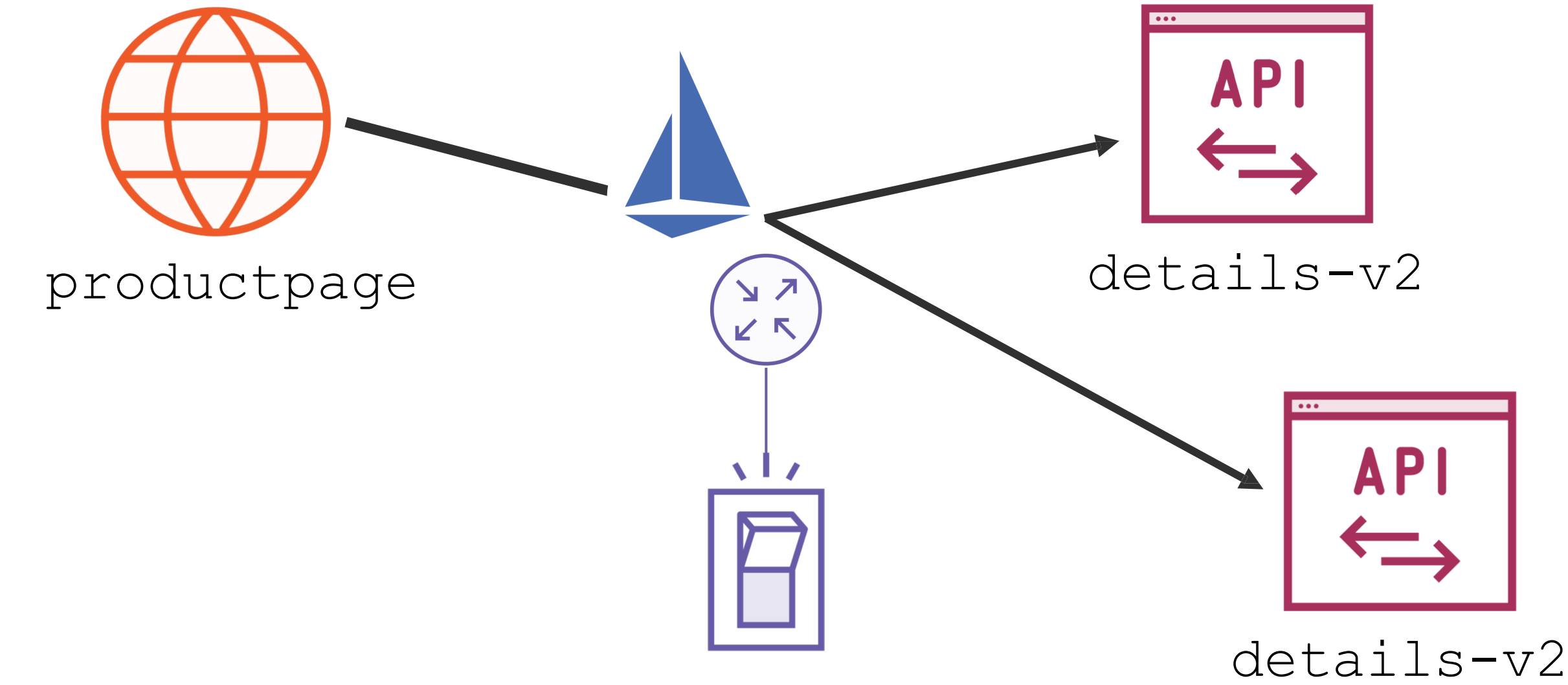
DevOps & Platform Engineer

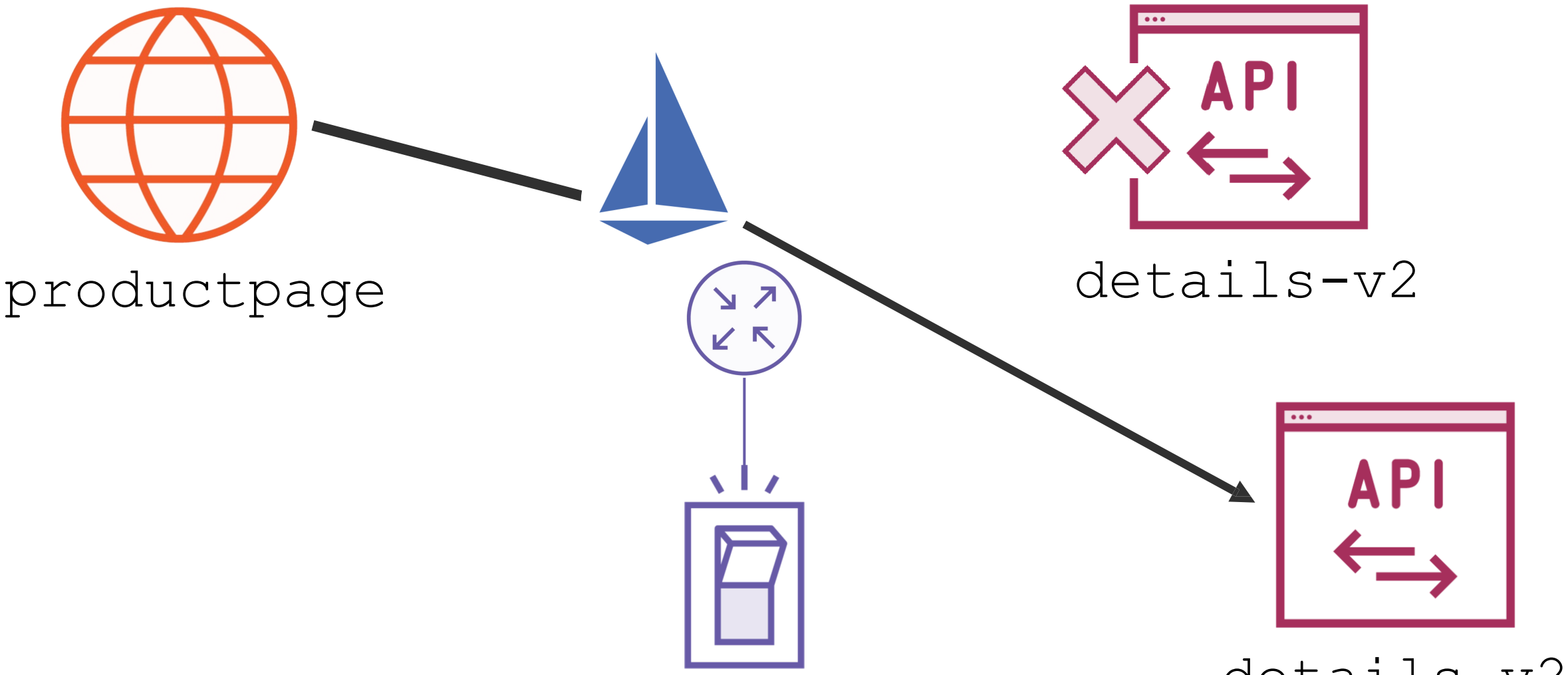

productpage
API
reviews-v1
API
reviews-v2

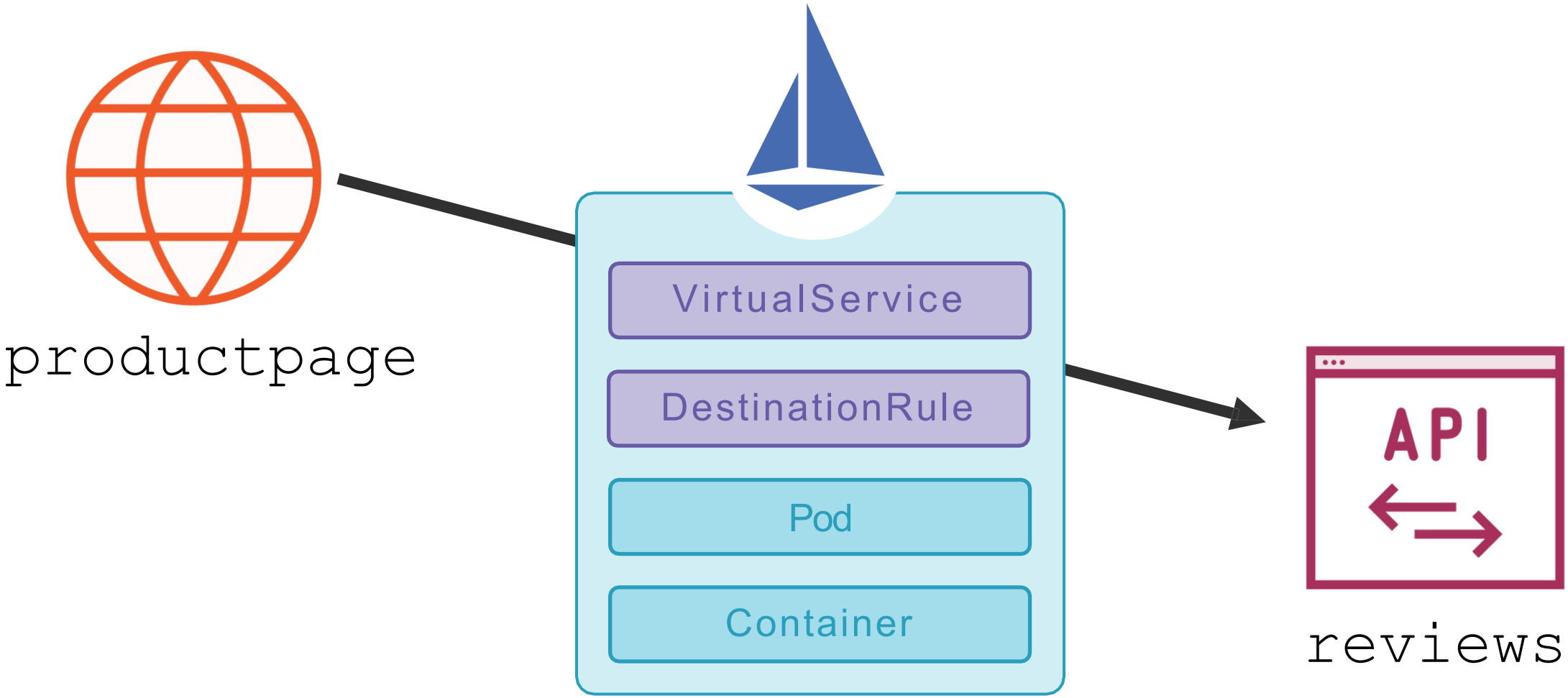

productpage-v1
productpage-v2


productpage-v1
productpage-v2


productpage-v1
productpage-v2


productpage
API
details-v2
API
details-v2


productpage
API
details-v2
API
details-v2

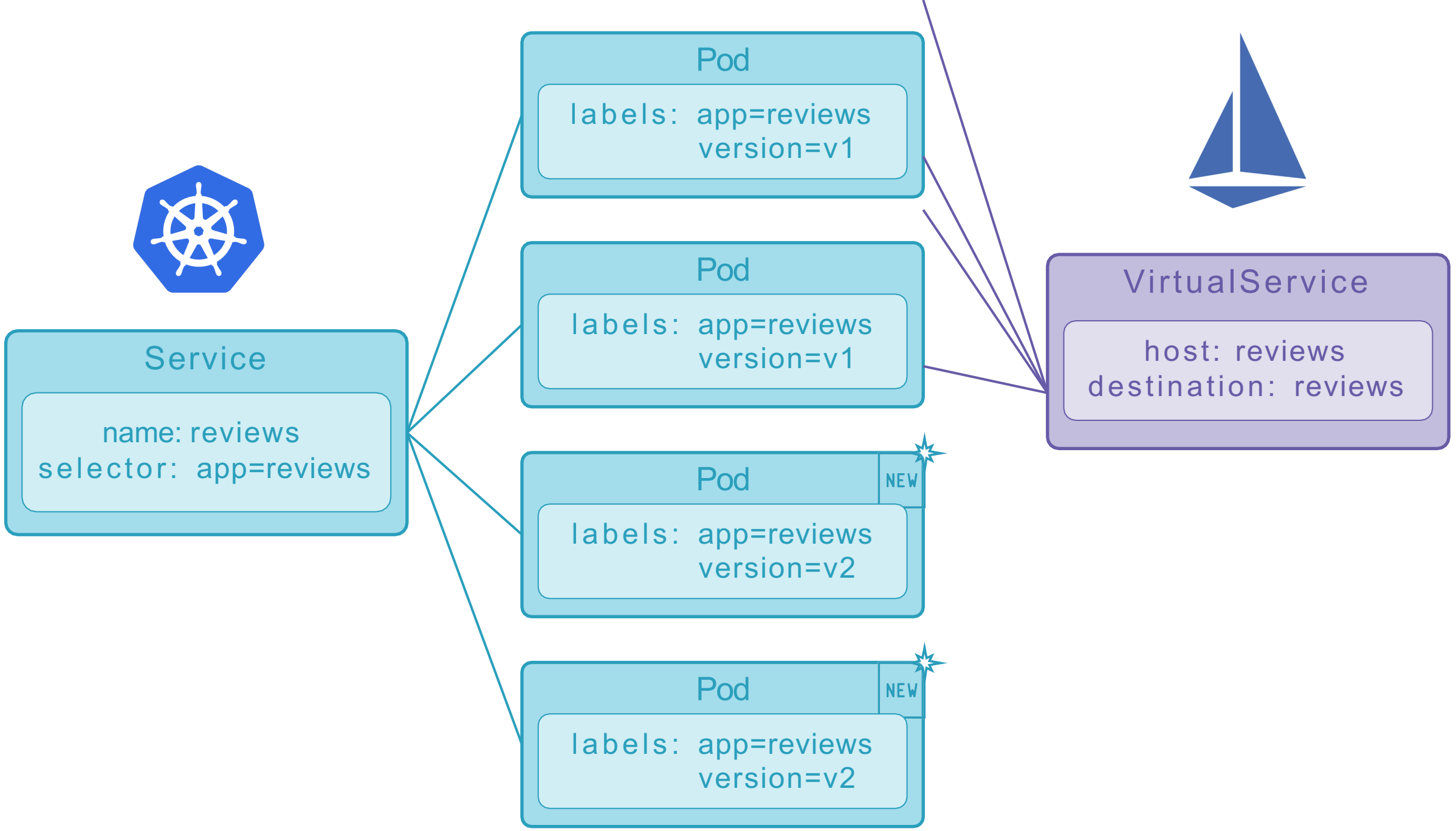

productpage
VirtualService
DestinationRule
Pod
Container
API
reviews

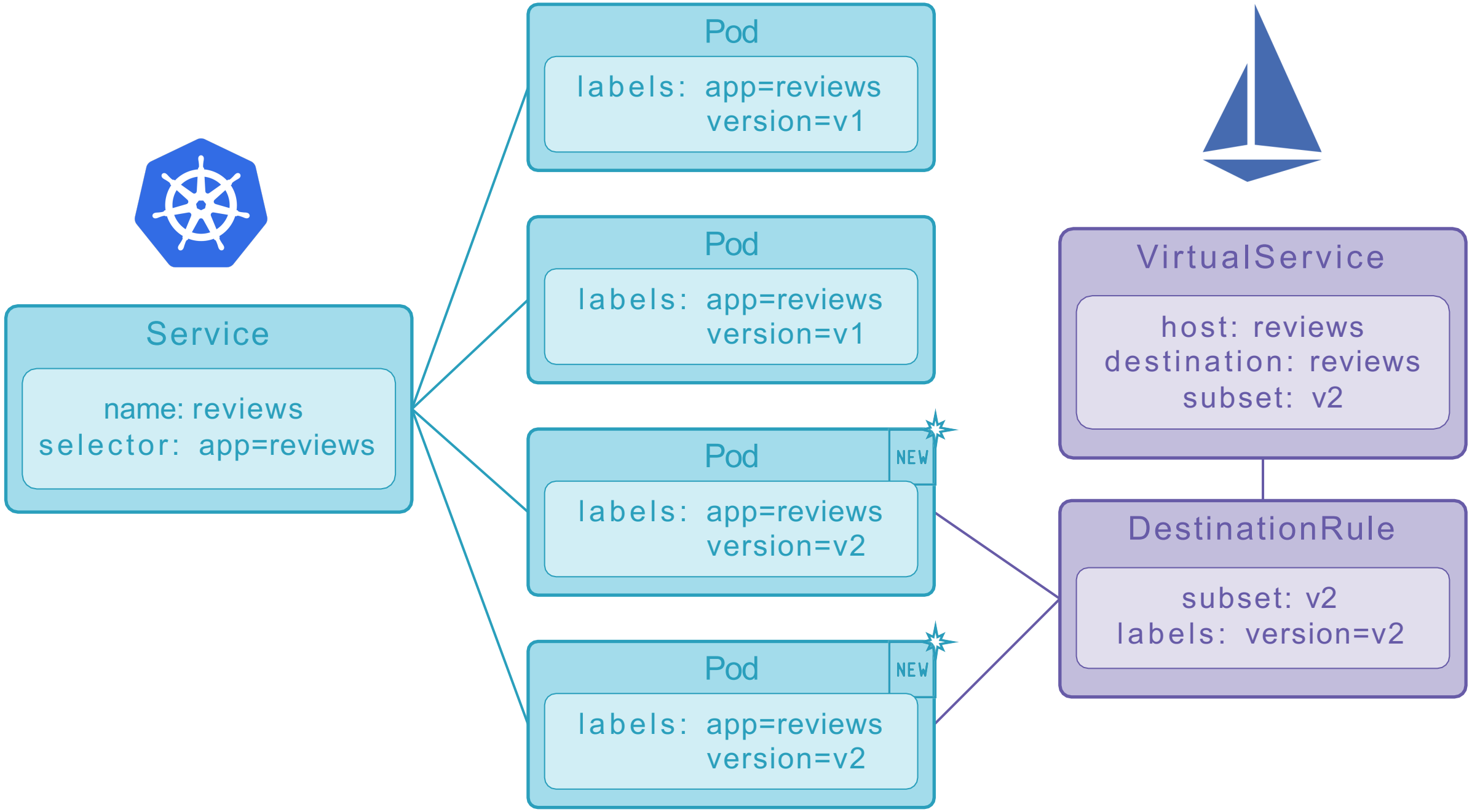
```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
spec:
  hosts:
  -reviews
  http:
  - route:
    - destination:
        host: reviews
        subset: v2
```

- The host requested by the client
- Routing for HTTP traffic
- The destination host routed by Istio
- The subset defined in the `DestinationRule`

```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
spec:
  host: reviews
  subsets:
  - name: v1
    labels:
      version: v1
  - name: v2
    labels:
      version: v2
```

- The host requested by the client
- Available subsets for routing
- Subsets identify targets by labels

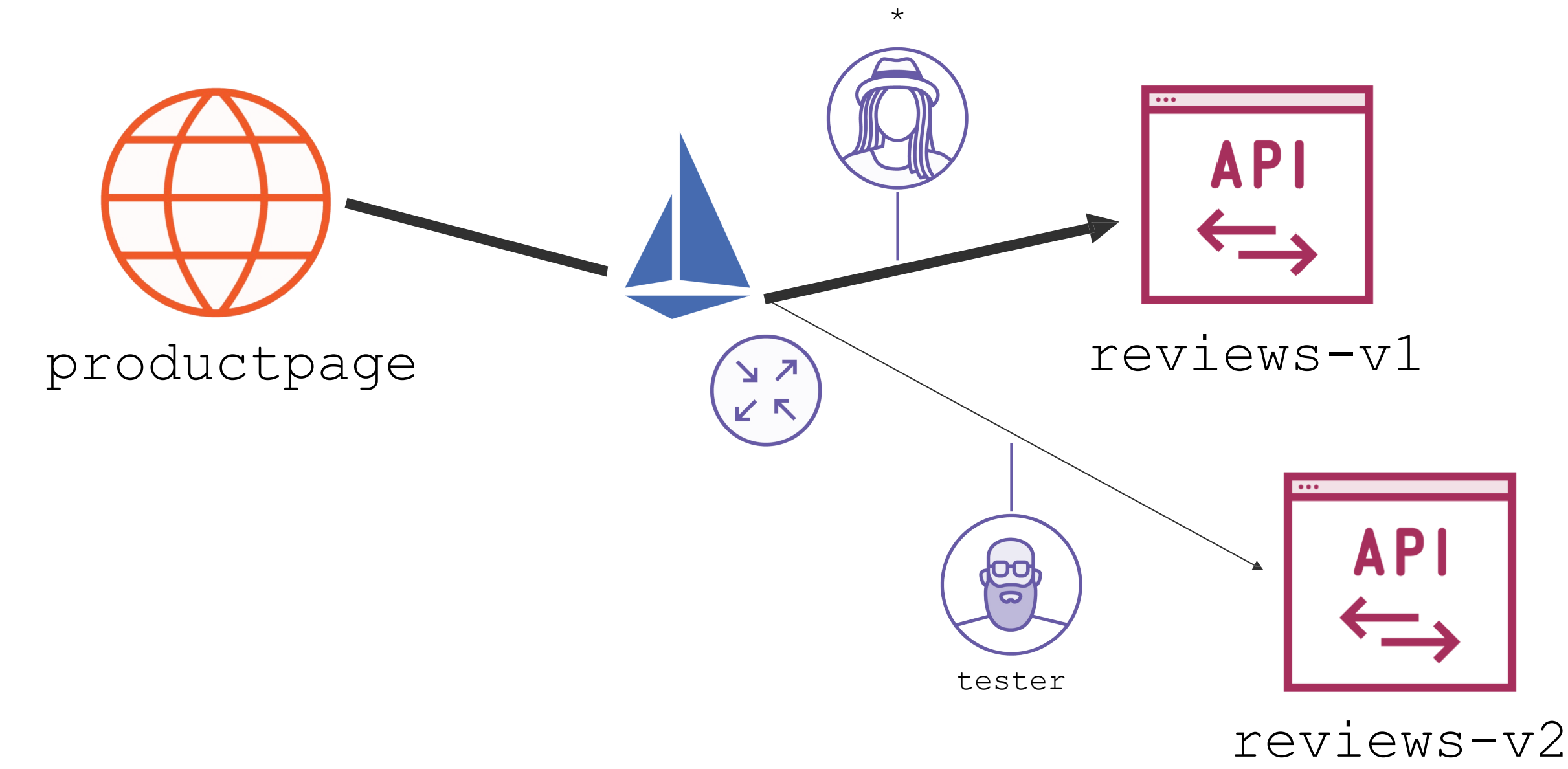

Service
name: reviews
selector: app=reviews
Pod
labels: app=reviews
version=v1
Pod
labels: app=reviews
version=v1
Pod
NEW
labels: app=reviews
version=v2
Pod
NEW
labels: app=reviews
version=v2
VirtualService
host: reviews
destination: reviews


Service
name: reviews
selector: app=reviews
Pod
labels: app=reviews
version=v1
Pod
labels: app=reviews
version=v1
Pod
NEW
labels: app=reviews
version=v2
Pod
NEW
labels: app=reviews
version=v2
VirtualService
host: reviews
destination: reviews
subset: v2
DestinationRule
subset: v2
labels: version=v2

Demo

Dark launch

- End-user routing
- Enable for test user
- Validate fault scenarios


*
productpage
API
reviews-v1
tester
API
reviews-v2

Custom Routing by User

DestinationRule.yaml

```yaml
host: reviews
subsets:
- name: v1
  labels:
    version: v1
- name: v2
  labels:
    version: v2
```

VirtualService.yaml

```yaml
http:
- match:
  - headers:
      end-user:
        exact: tester
  route:
  -   destination:
      host: reviews
      subset: v2
```

Delay Injection

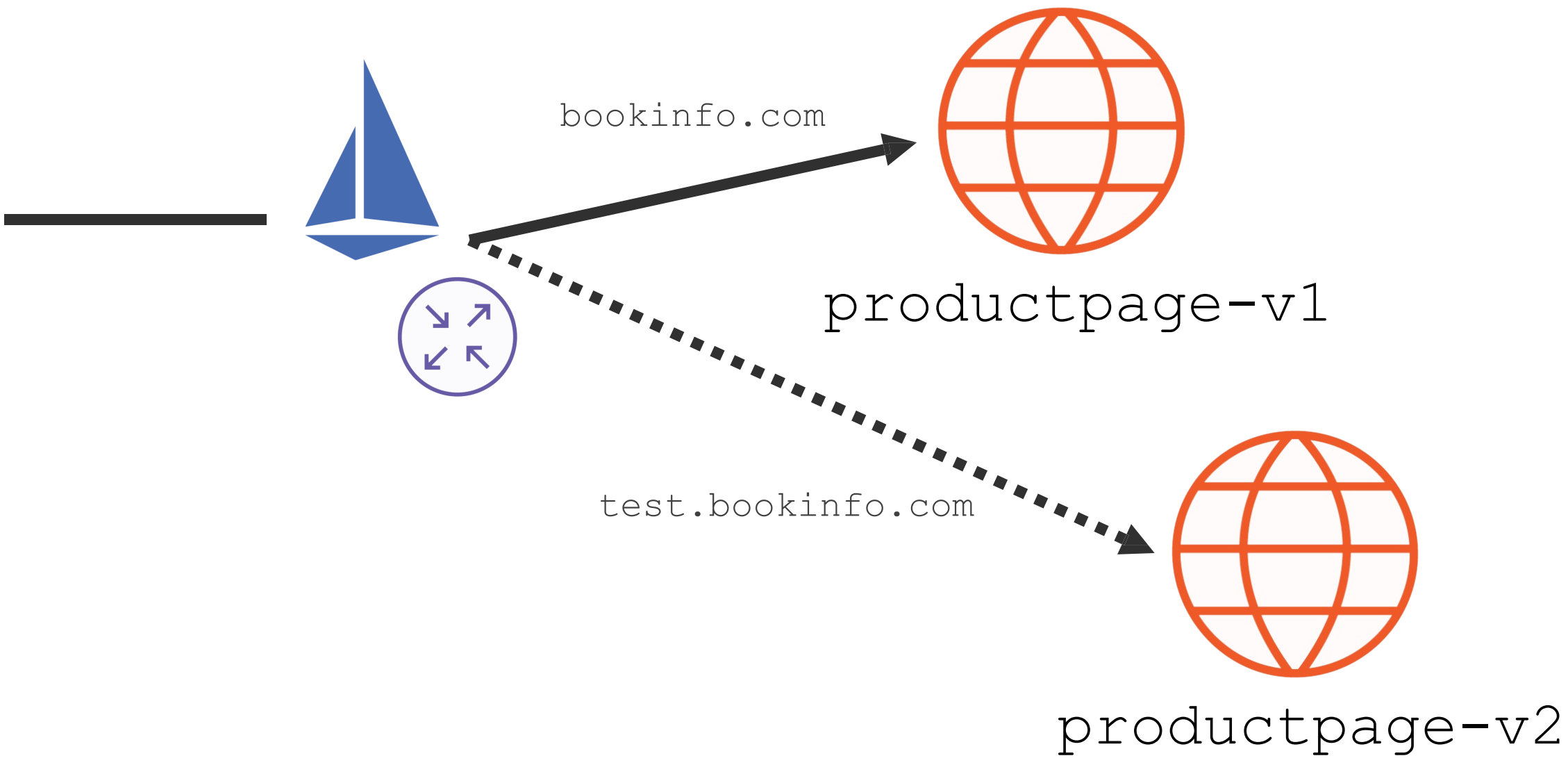
VirtualService.yaml

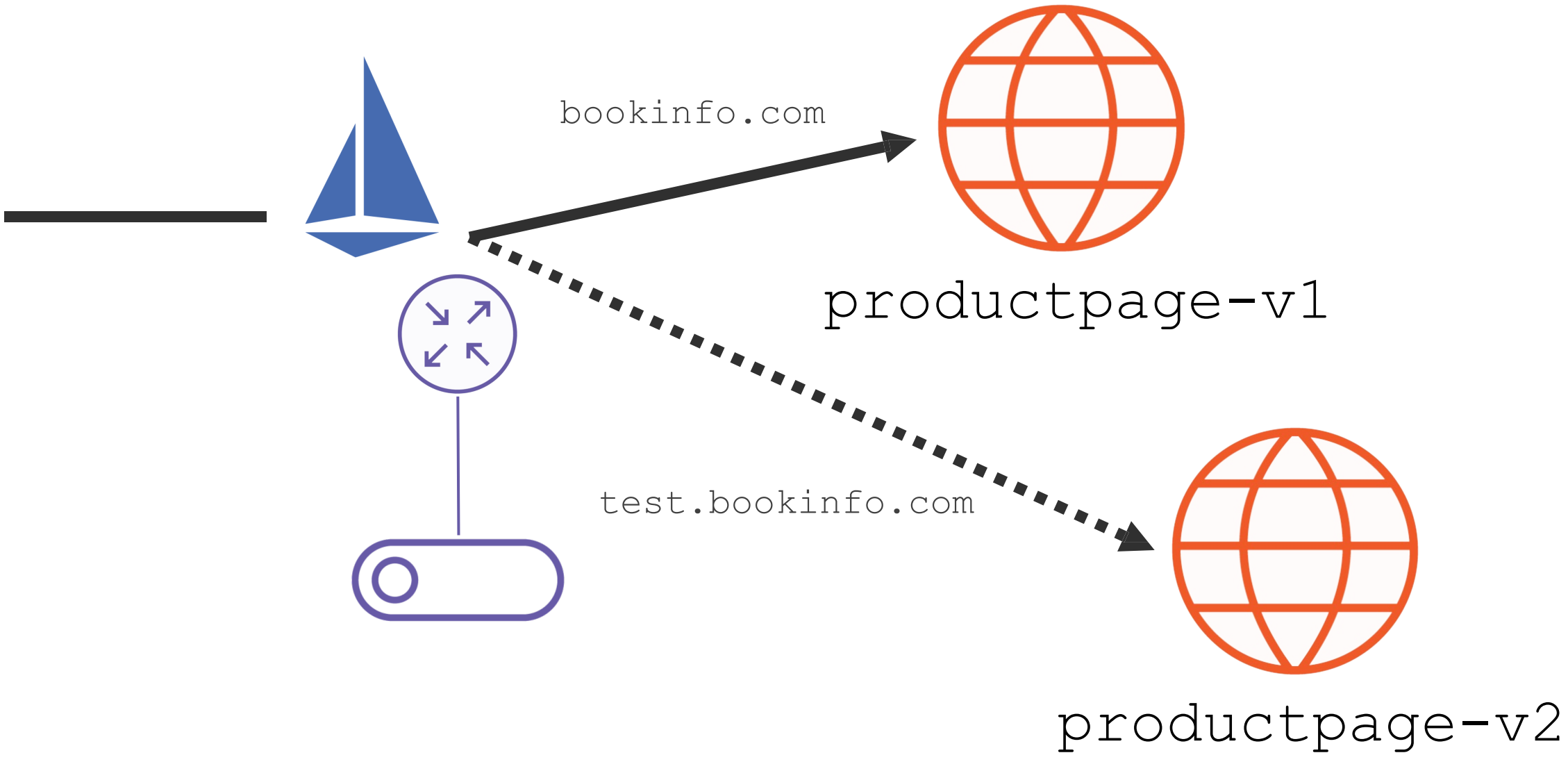
```yaml
http:
- match:
  - headers:
      end-user:
        exact: tester
  fault:
    delay:
      percent: 100
      fixedDelay: 2.5s
  route:
  - destination:
      host: reviews
      subset: v2
- route:
  - destination:
      host: reviews
      subset: v1
```

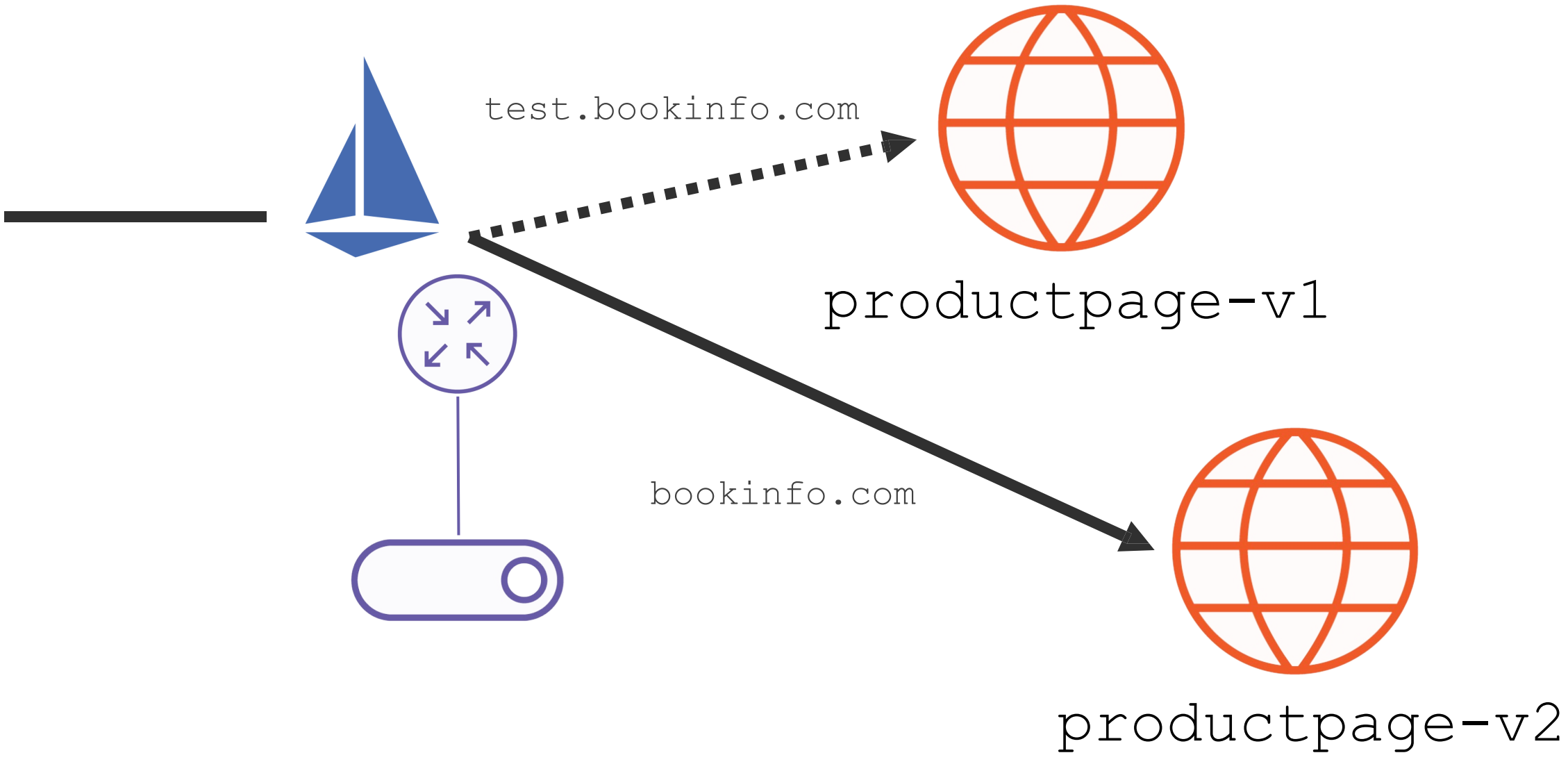
Fault Injection

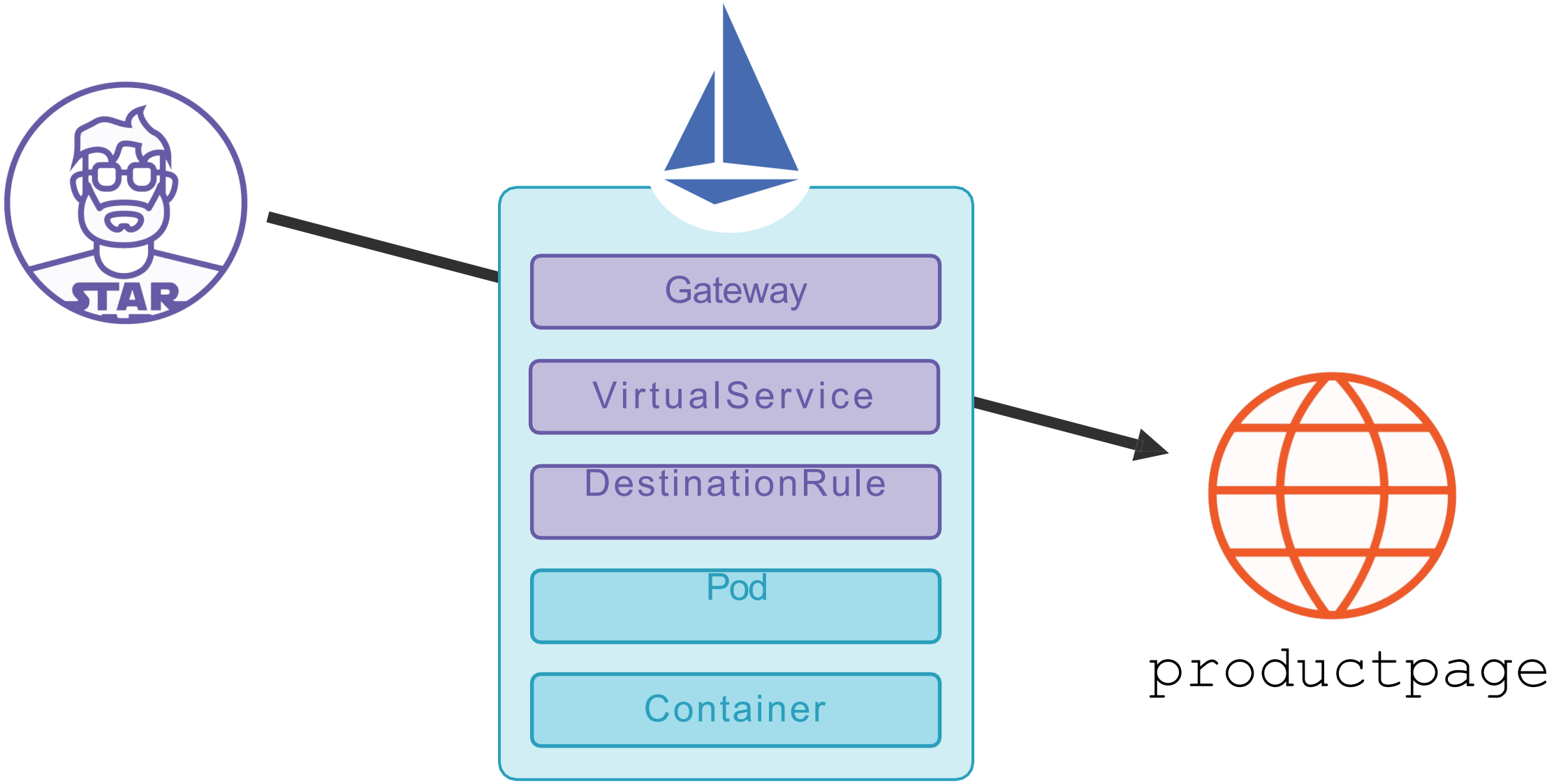
VirtualService.yaml

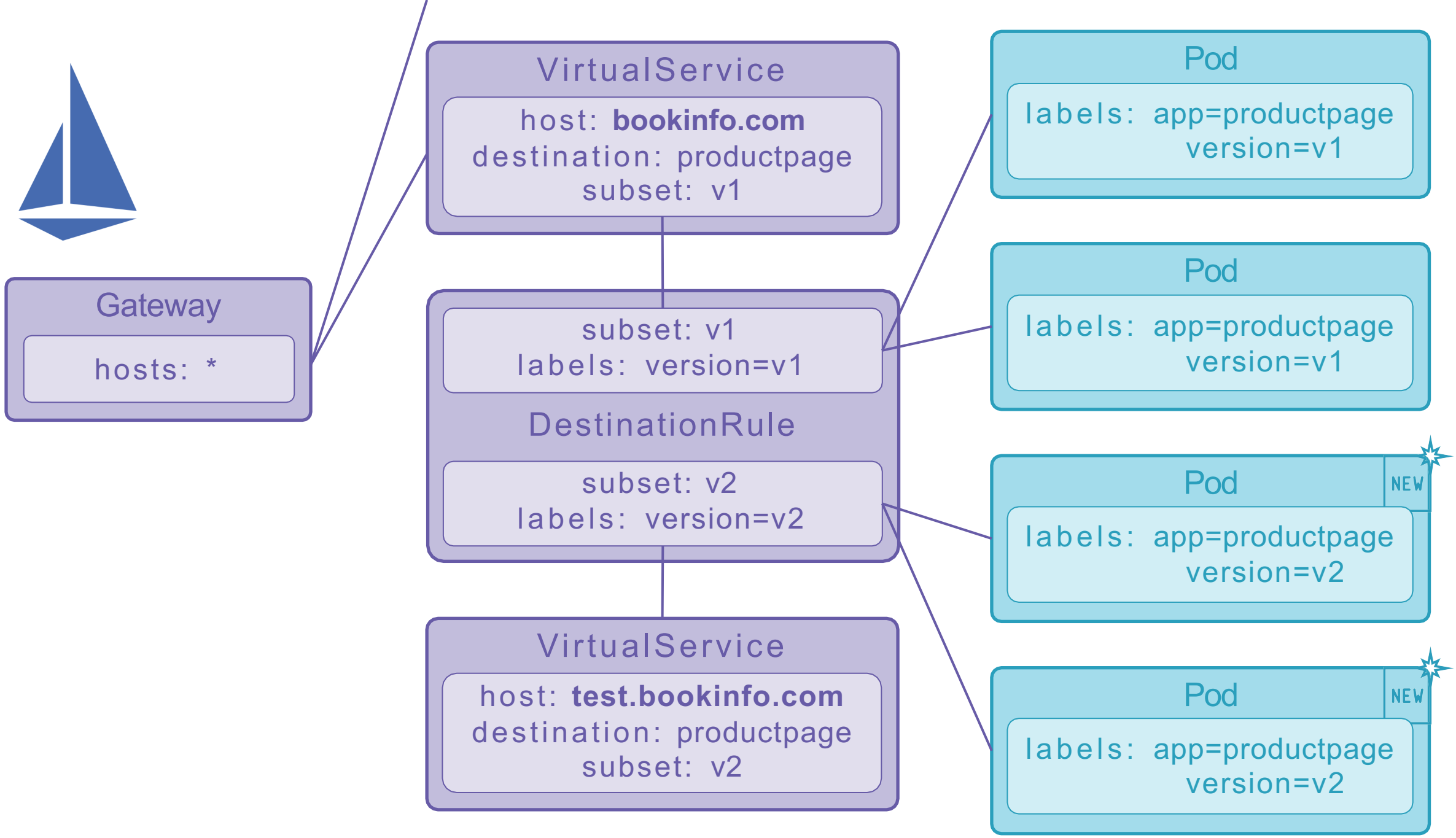
```yaml
http:
- match:
  - headers:
      end-user:
        exact: tester
  fault:
    abort:
      percent: 50
      httpStatus: 503
  route:
  - destination:
      host: reviews
      subset: v2
- route:
  - destination:
      host: reviews
      subset: v1
```

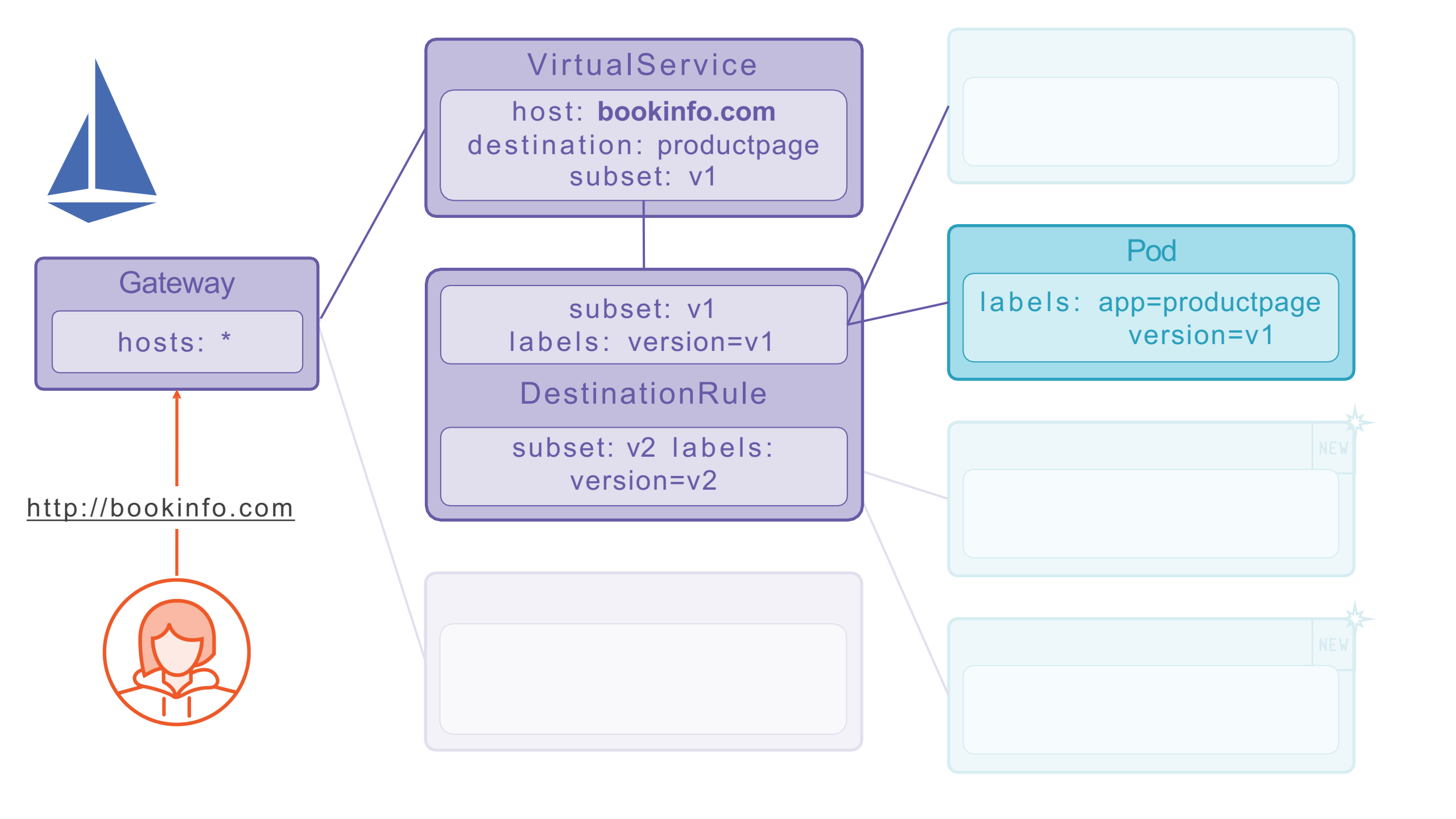

bookinfo.com
productpage-v1
test.bookinfo.com
productpage-v2

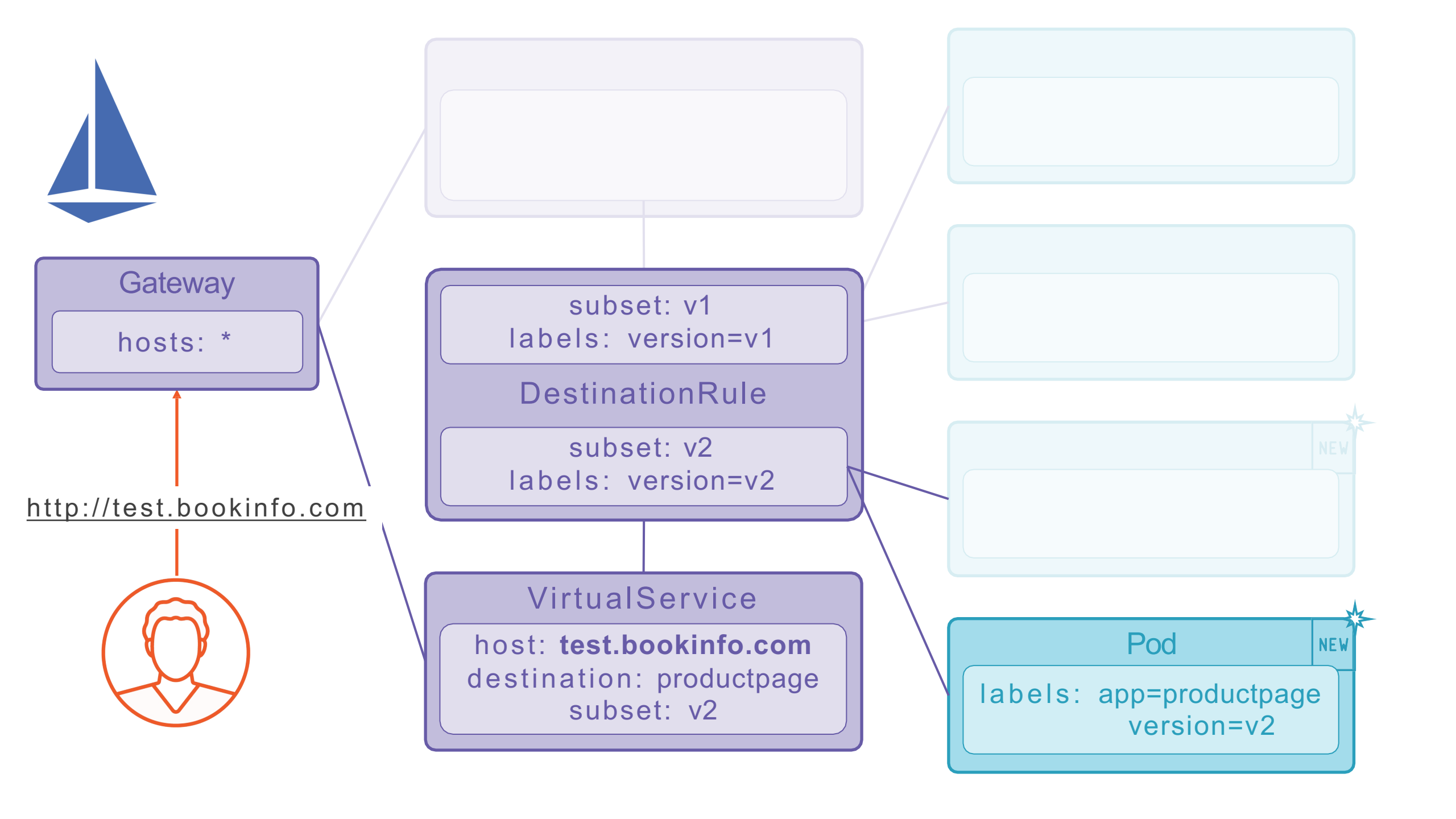

bookinfo.com
productpage-v1
test.bookinfo.com
productpage-v2

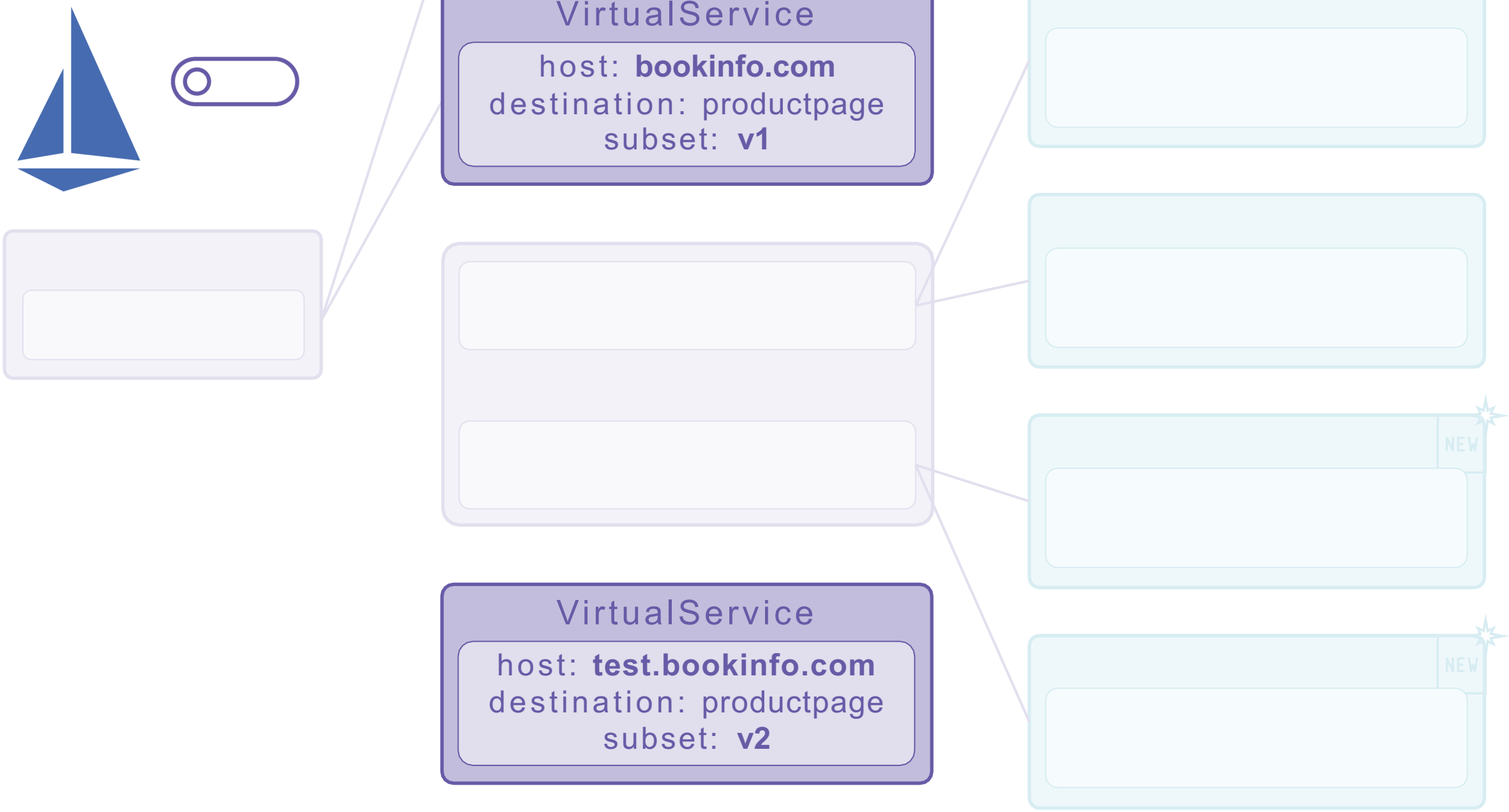

test.bookinfo.com
productpage-v1
bookinfo.com
productpage-v2

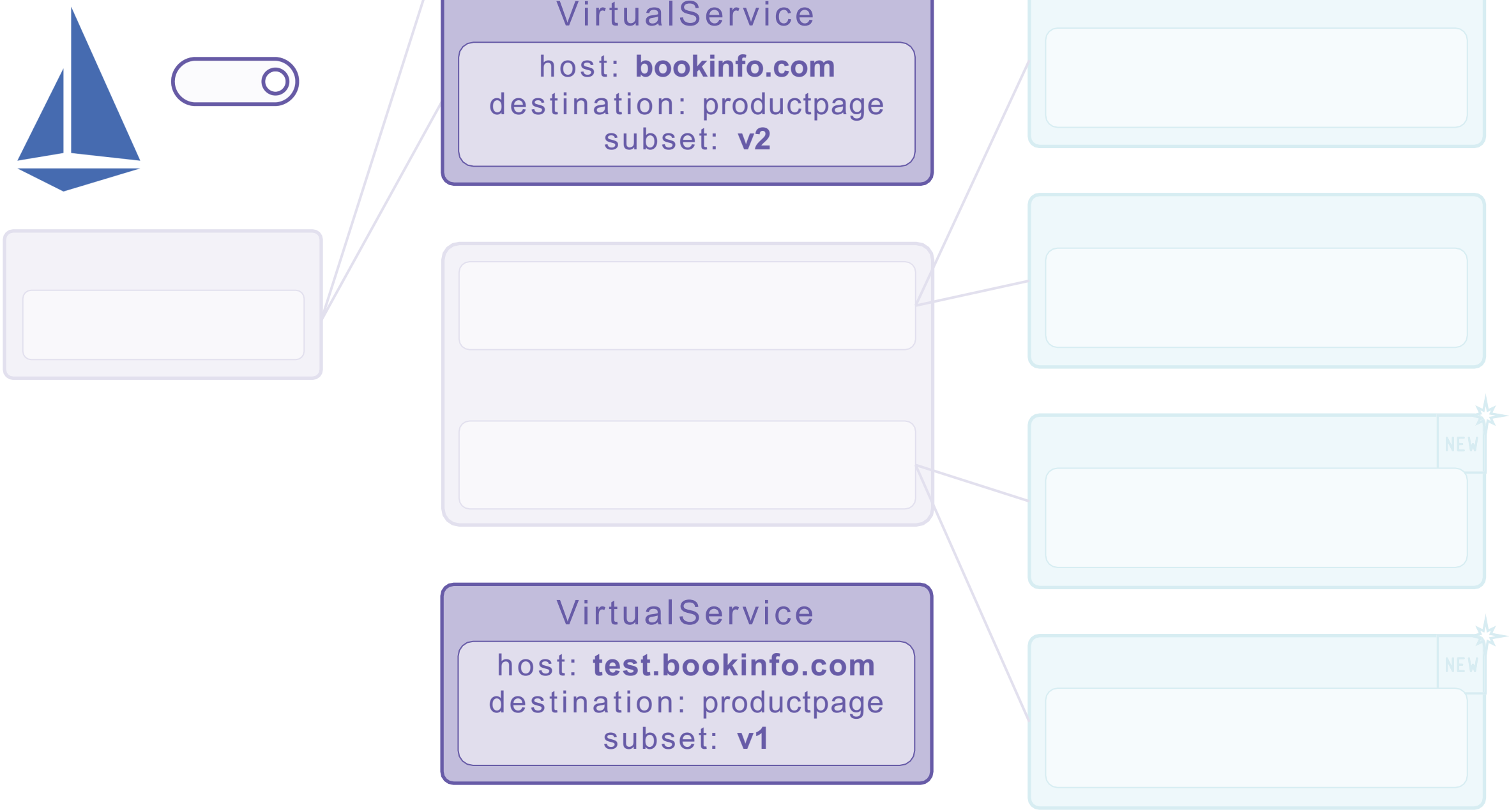

STAR
Gateway
VirtualService
DestinationRule
Pod
Container
productpage

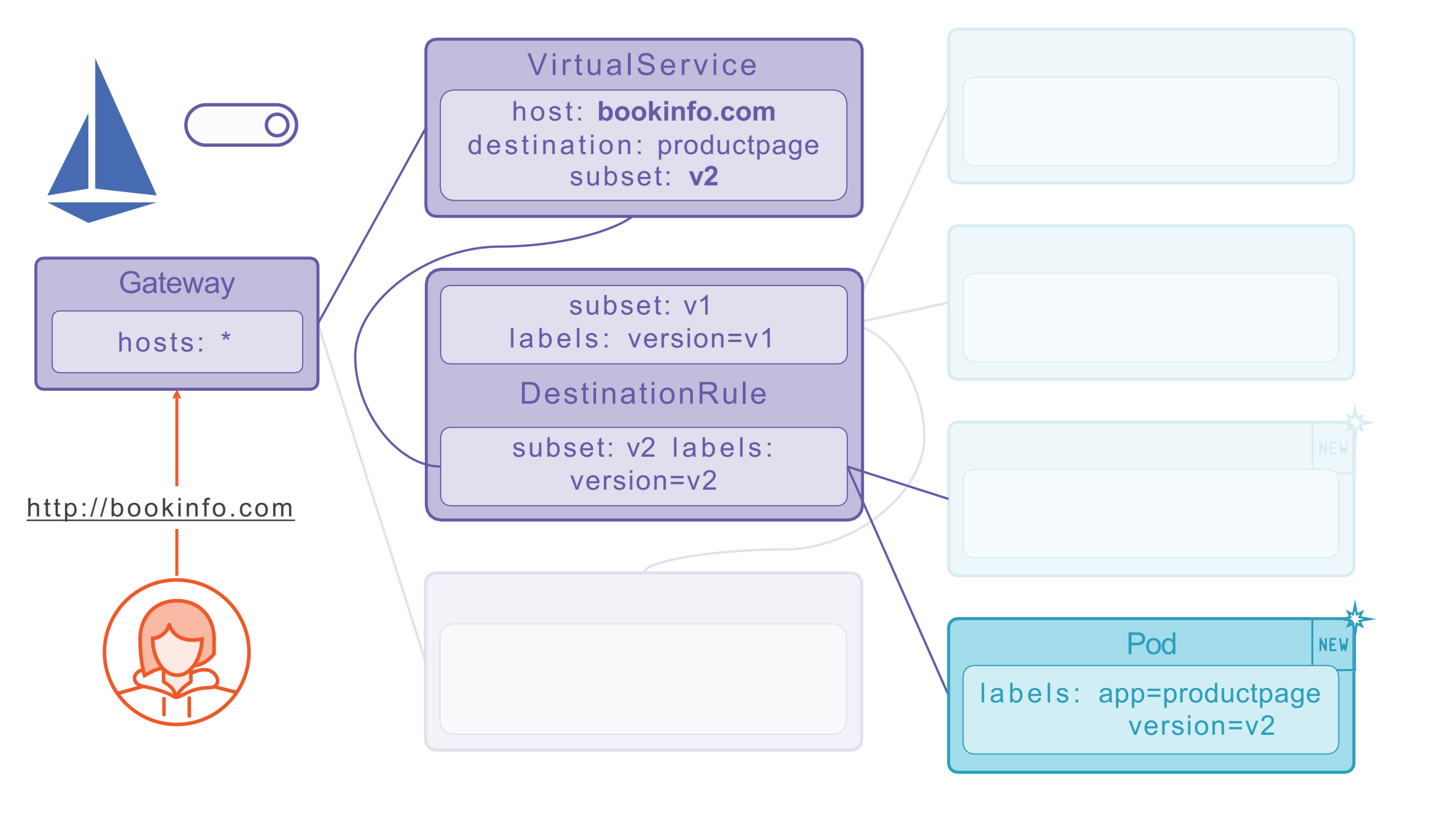

Gateway
hosts: *
VirtualService
host: bookinfo.com
destination: productpage
subset: v1
subset: v1
labels: version=v1
DestinationRule
subset: v2
labels: version=v2
VirtualService
host: test.bookinfo.com
destination: productpage
subset: v2
Pod
labels: app=productpage
version=v1
Pod
labels: app=productpage
version=v1
Pod
NEW
labels: app=productpage
version=v2
Pod
NEW
labels: app=productpage
version=v2


VirtualService
host: bookinfo.com
destination: productpage
subset: v1
Gateway
hosts: *
subset: v1
labels: version=v1
DestinationRule
subset: v2 labels:
version=v2
Pod
labels: app=productpage
version=v1
NEW
NEW
http://bookinfo.com


Gateway
hosts: *
http://test.bookinfo.com
subset: v1
labels: version=v1
DestinationRule
subset: v2
labels: version=v2
VirtualService
host: test.bookinfo.com
destination: productpage
subset: v2
NEW
Pod
NEW
labels: app=productpage
version=v2


VirtualService
host: bookinfo.com
destination: productpage
subset: v1
VirtualService
host: test.bookinfo.com
destination: productpage
subset: v2
NEW
NEW

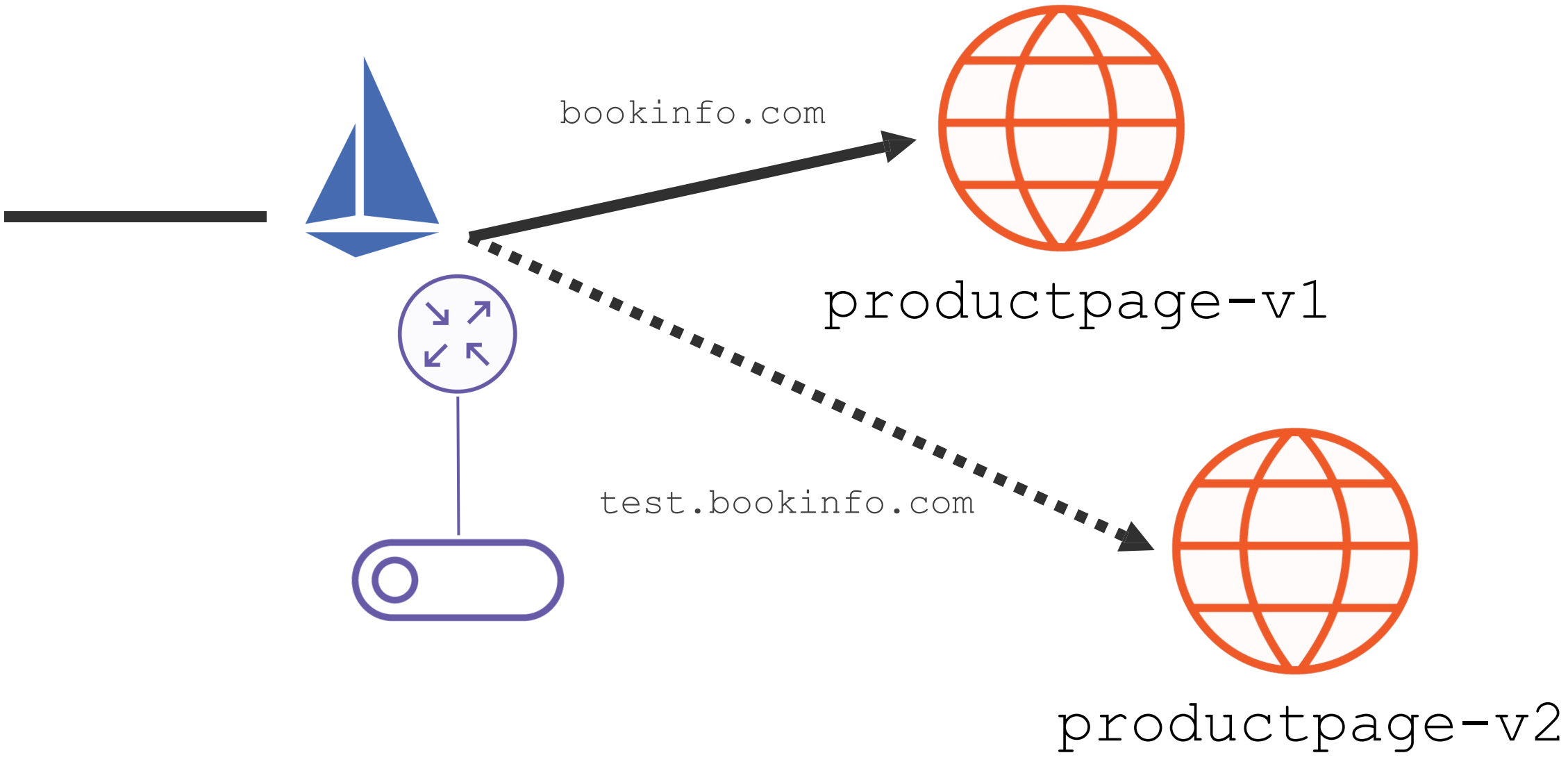

VirtualService
host: bookinfo.com
destination: productpage
subset: v2
NEW
VirtualService
host: test.bookinfo.com
destination: productpage
subset: v1
NEW

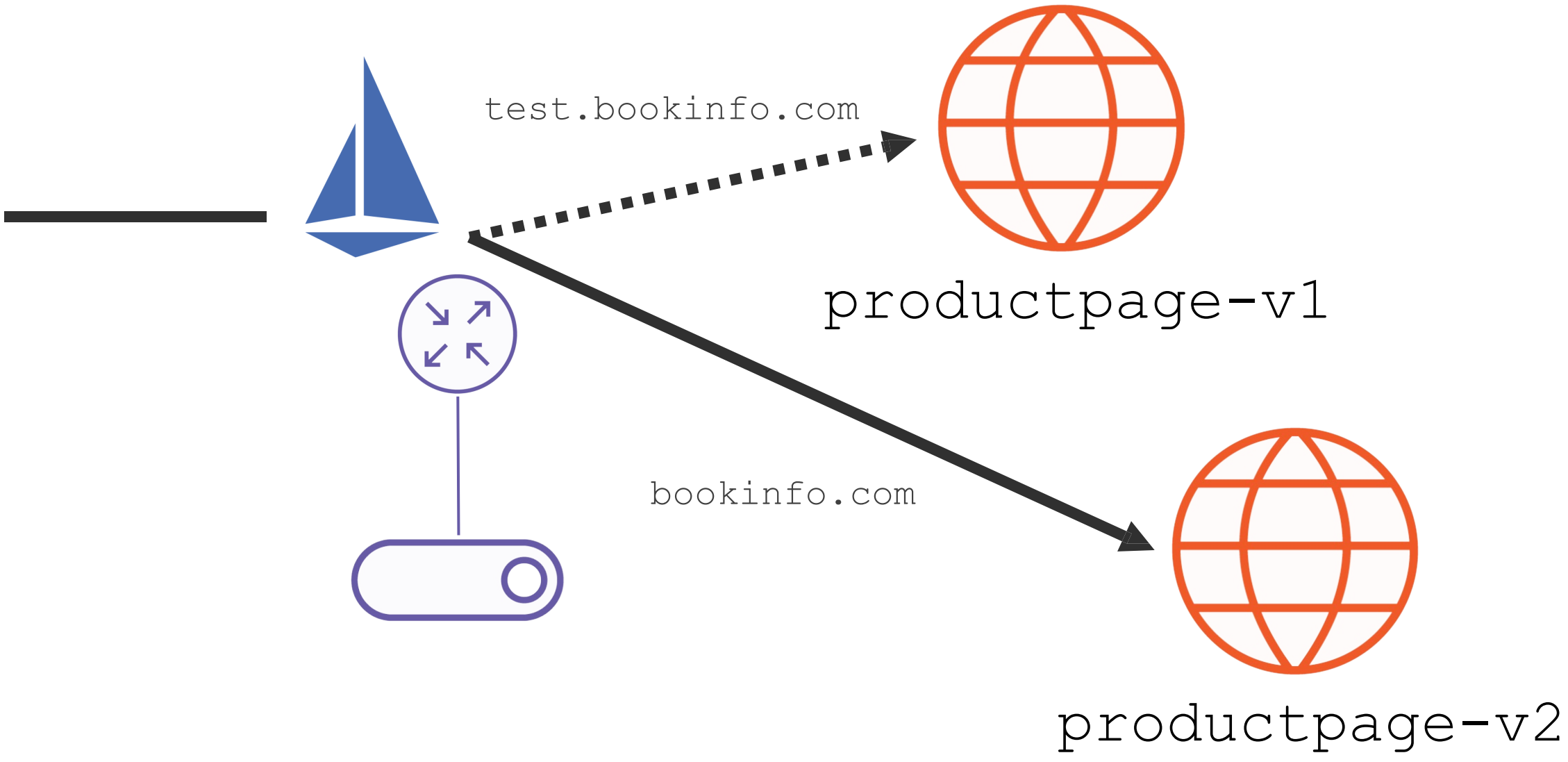

VirtualService
host: bookinfo.com
destination: productpage
subset: v2
Gateway
hosts: *
subset: v1
labels: version=v1
DestinationRule
subset: v2 labels:
version=v2
NEW
http://bookinfo.com
Pod
NEW
labels: app=productpage
version=v2

Demo

Blue/green deployment

- Live and test domains
- Switch from test to live
- And back again


bookinfo.com
productpage-v1
test.bookinfo.com
productpage-v2


test.bookinfo.com
productpage-v1
bookinfo.com
productpage-v2

Blue/Green Deployments

VirtualService-Live.yaml

```yaml
hosts:
- bookinfo.local
gateways:
- bookinfo-gateway
http:
  - route:
      - destination:
          host: productpage
          subset: v1
```

VirtualService-Test.yaml

```yaml
hosts:
- test.bookinfo.local
gateways:
- bookinfo-gateway
http:
  - route:
      - destination:
          host: productpage
          subset: v2
```

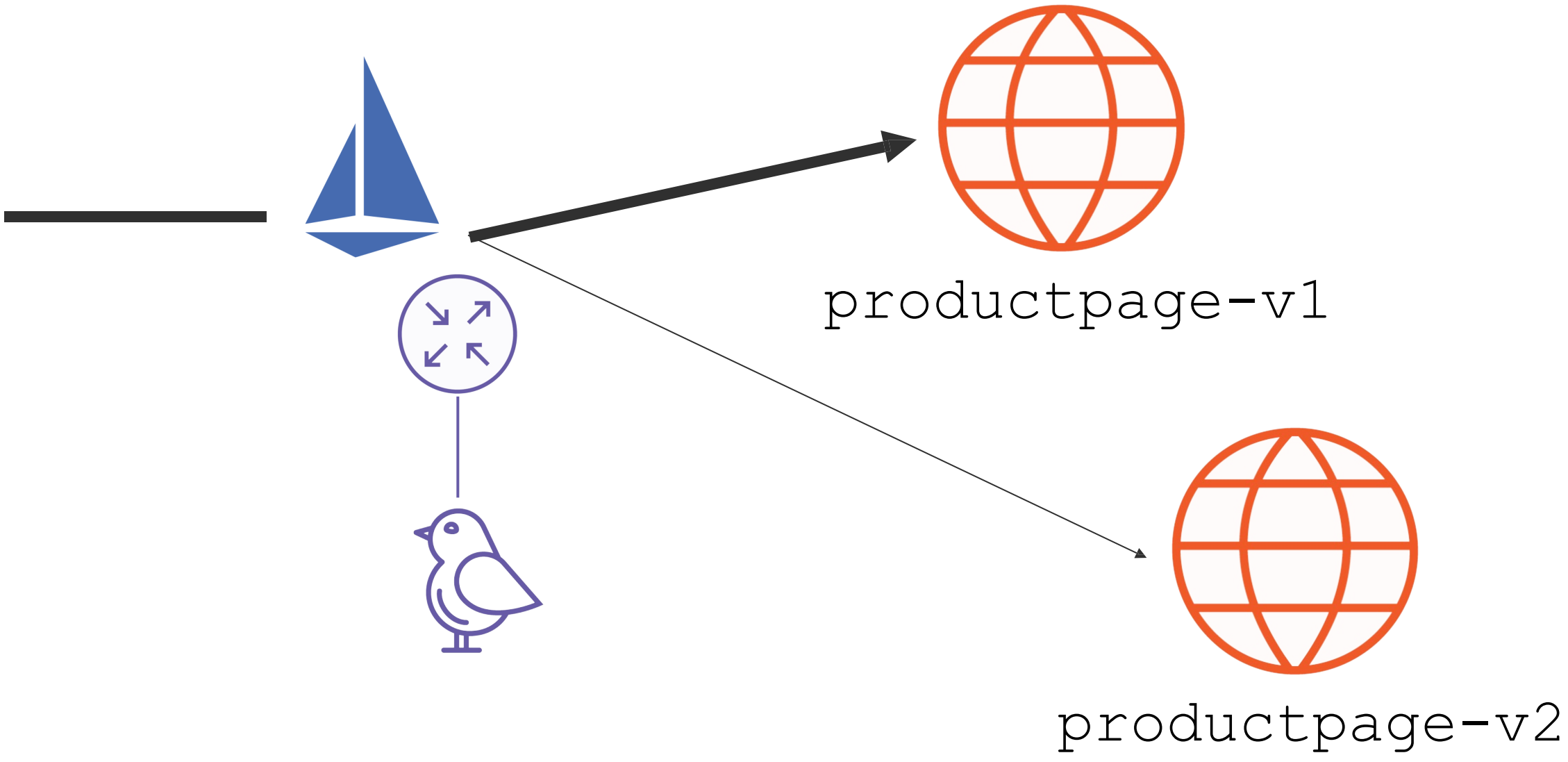
Blue/Green Deployments

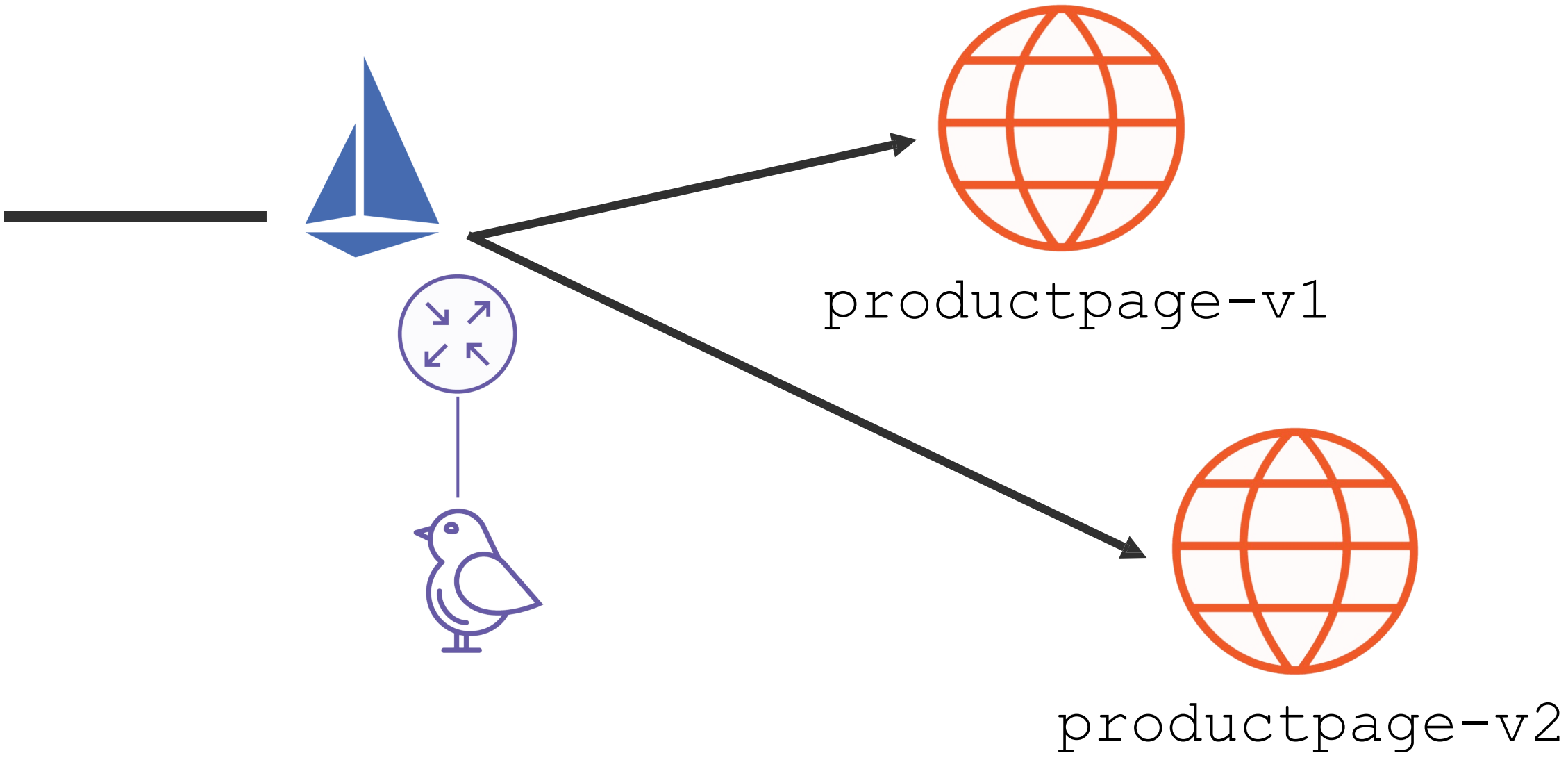
VirtualService-Live.yaml

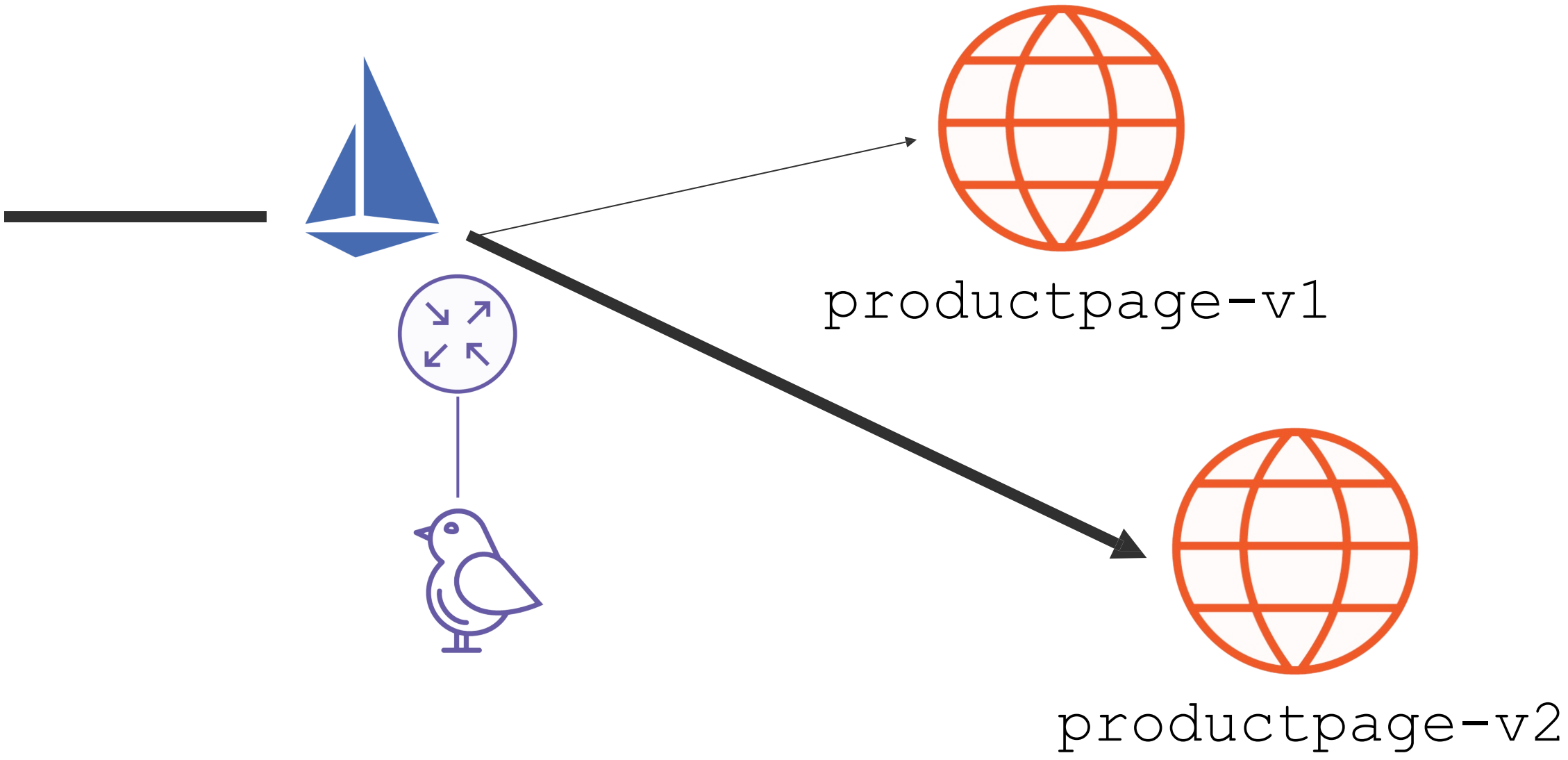
```yaml
hosts:
- bookinfo.local
gateways:
- bookinfo-gateway
http:
  - route:
      - destination:
          host: productpage
          subset: v2
```

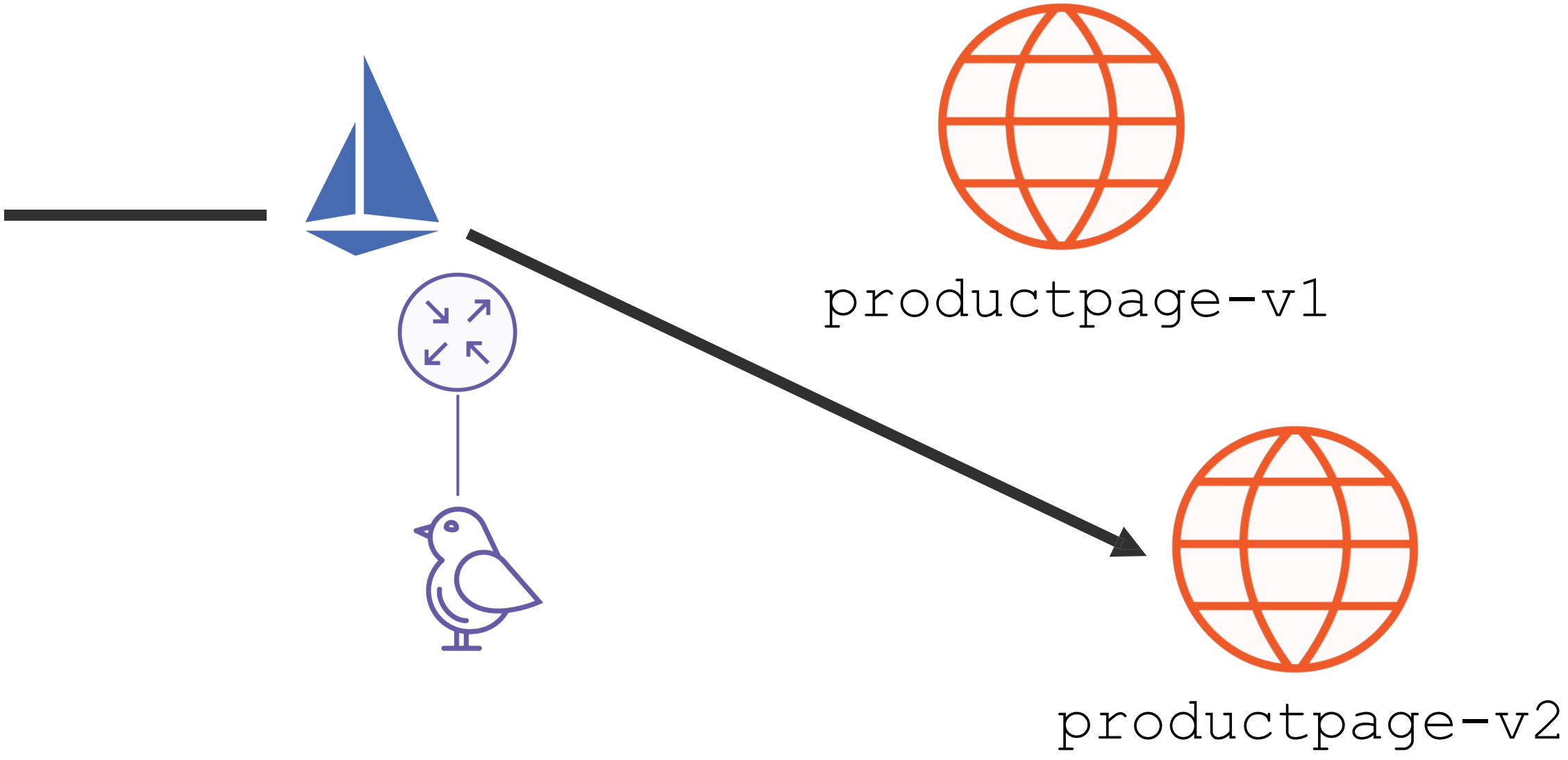
VirtualService-Test.yaml

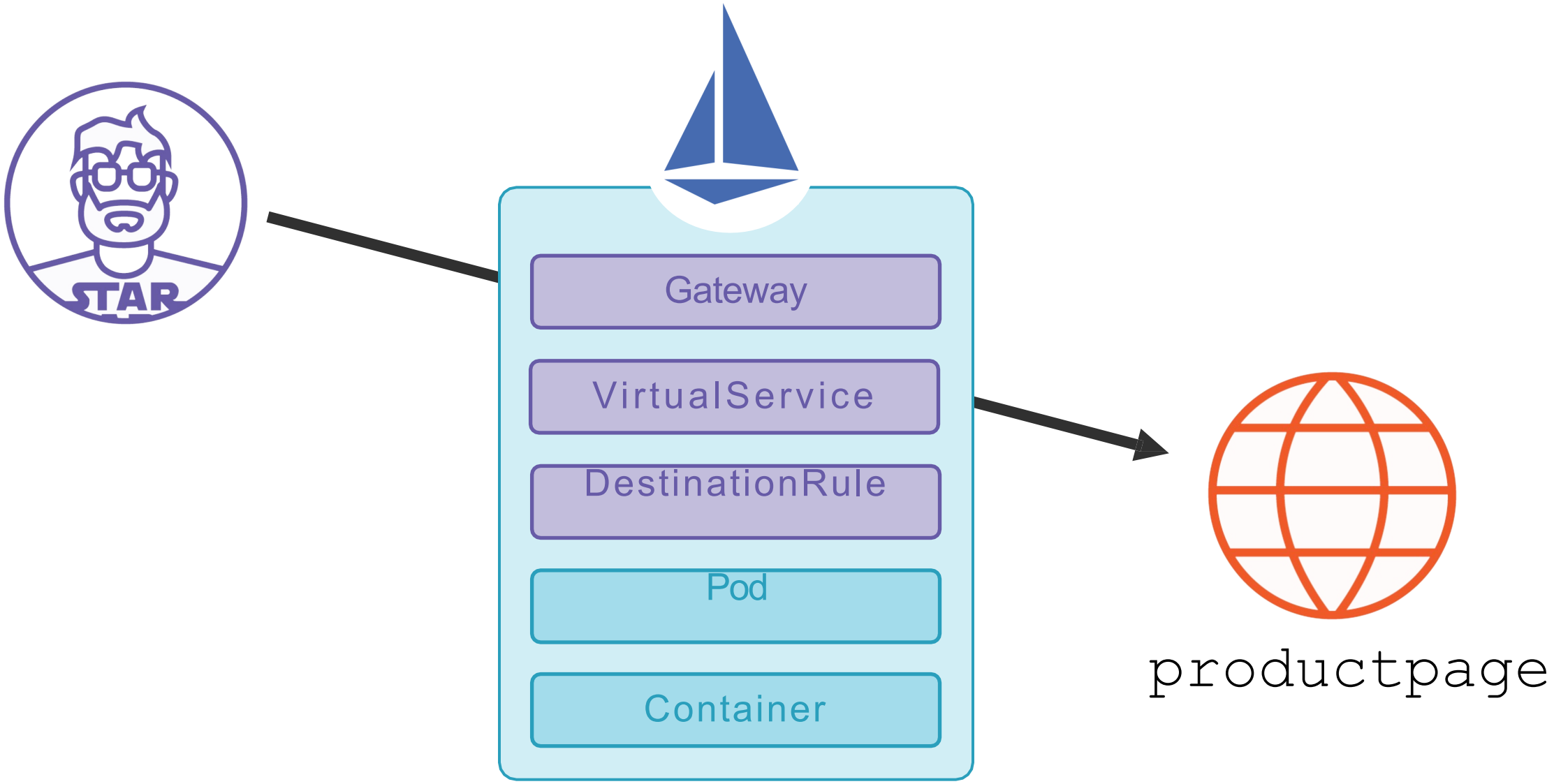
```yaml
hosts:
- test.bookinfo.local
gateways:
- bookinfo-gateway
http:
  - route:
      - destination:
          host: productpage
          subset: v1
```

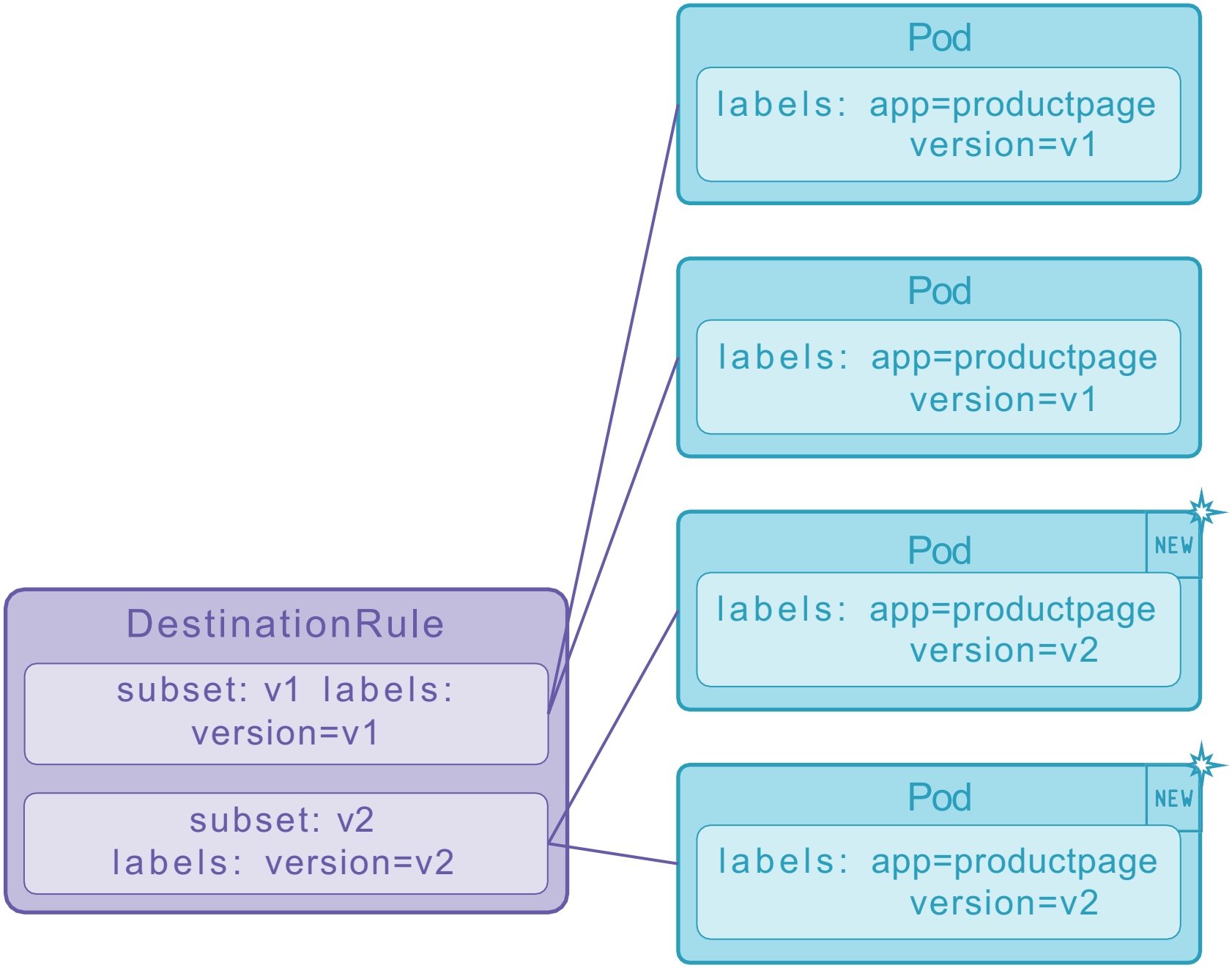

productpage-v1
productpage-v2

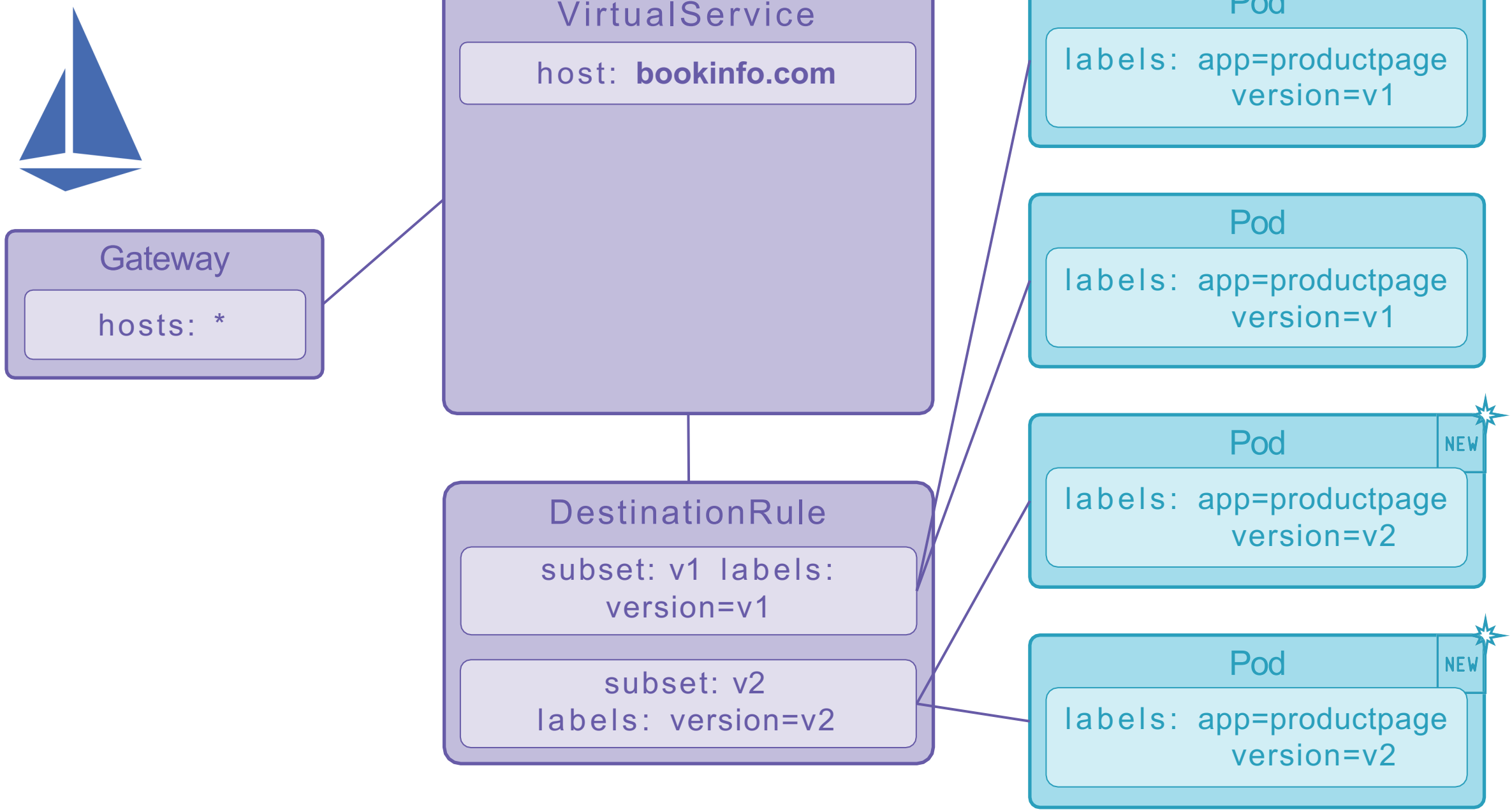

productpage-v1
productpage-v2

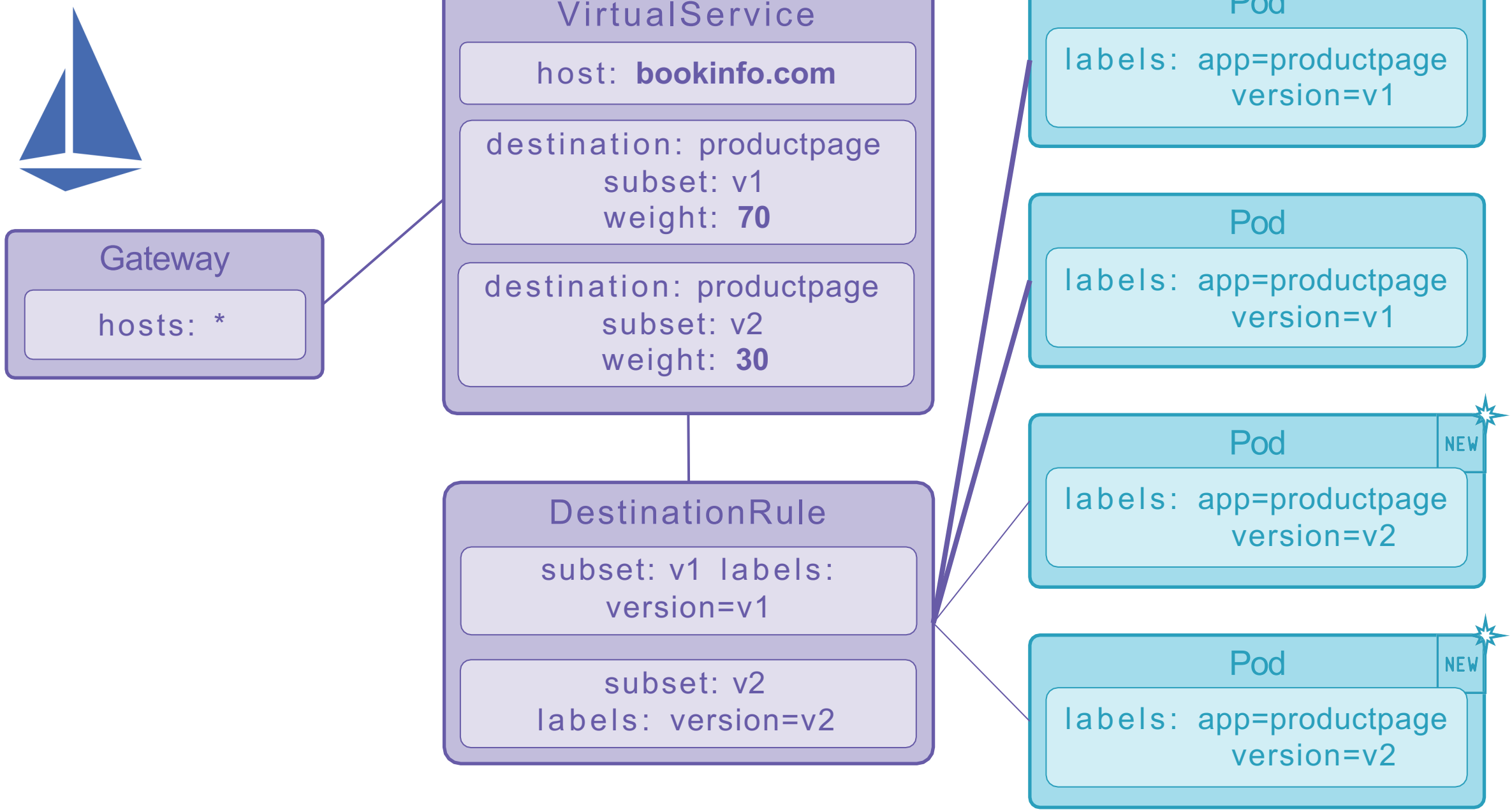

productpage-v1
productpage-v2

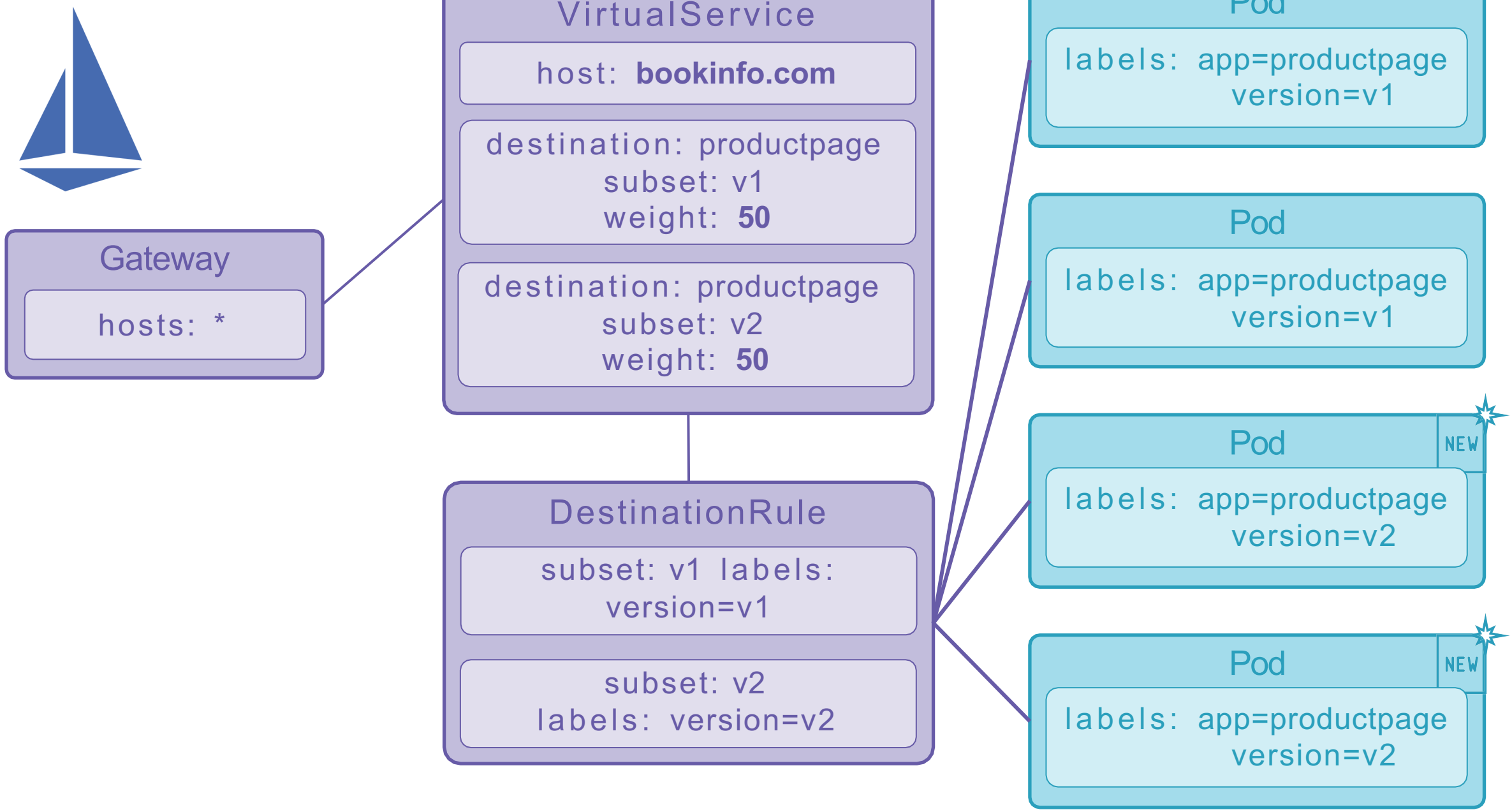

productpage-v1
productpage-v2

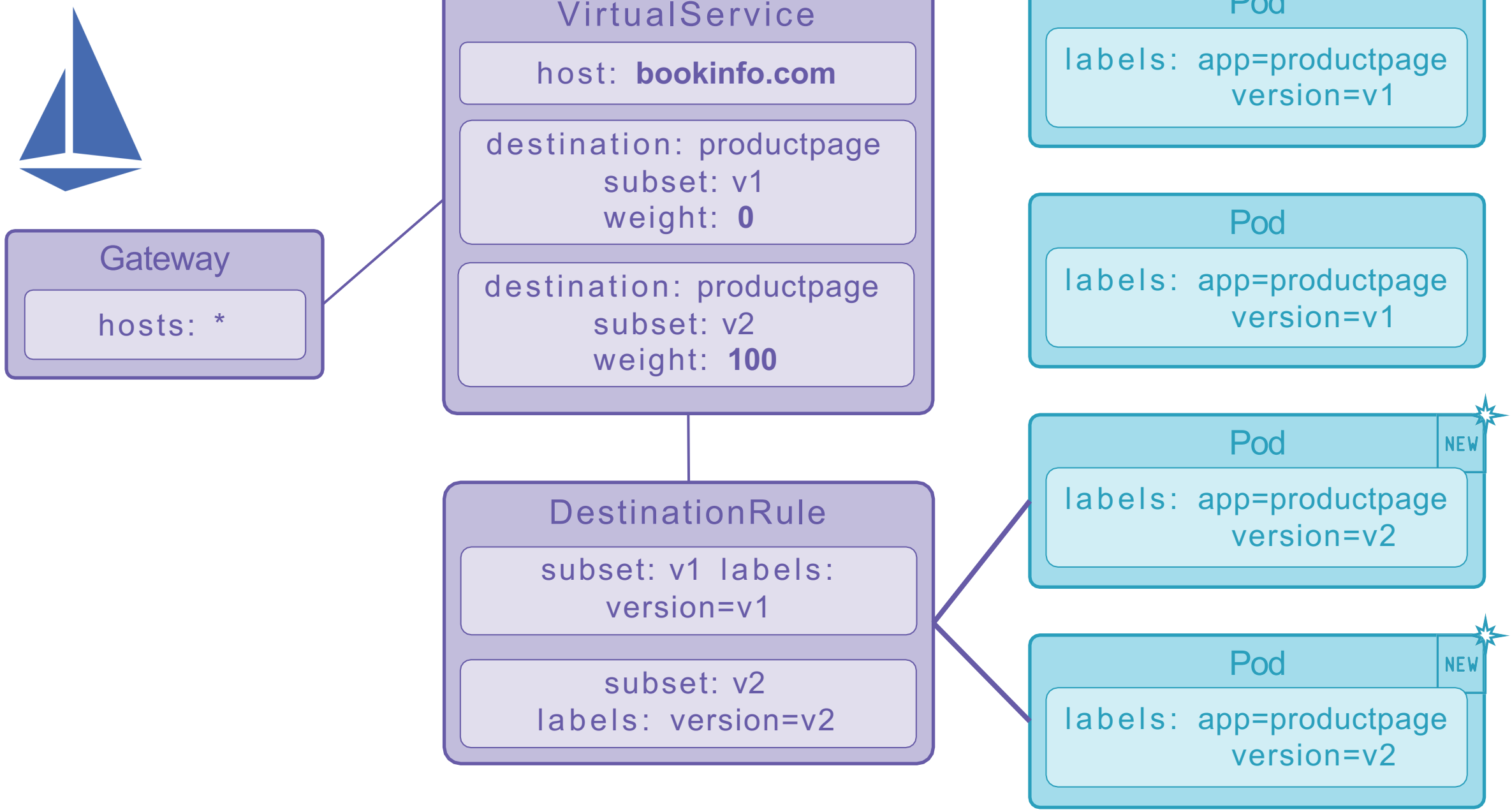

STAR
Gateway
VirtualService
DestinationRule
Pod
Container
productpage


DestinationRule
subset: v1 labels:
version=v1
subset: v2
labels: version=v2
Pod
labels: app=productpage
version=v1
Pod
labels: app=productpage
version=v1
Pod
NEW
labels: app=productpage
version=v2
Pod
NEW
labels: app=productpage
version=v2


Gateway
hosts: *
VirtualService
host: bookinfo.com
DestinationRule
subset: v1 labels: version=v1
subset: v2 labels: version=v2
Pod
labels: app=productpage version=v1
Pod
labels: app=productpage version=v1
Pod
NEW
labels: app=productpage version=v2
Pod
NEW
labels: app=productpage version=v2


Gateway
hosts: *
VirtualService
host: bookinfo.com
destination: productpage
subset: v1
weight: 70
destination: productpage
subset: v2
weight: 30
DestinationRule
subset: v1 labels:
version=v1
subset: v2
labels: version=v2
Pod
labels: app=productpage
version=v1
Pod
labels: app=productpage
version=v1
Pod
NEW
labels: app=productpage
version=v2
Pod
NEW
labels: app=productpage
version=v2

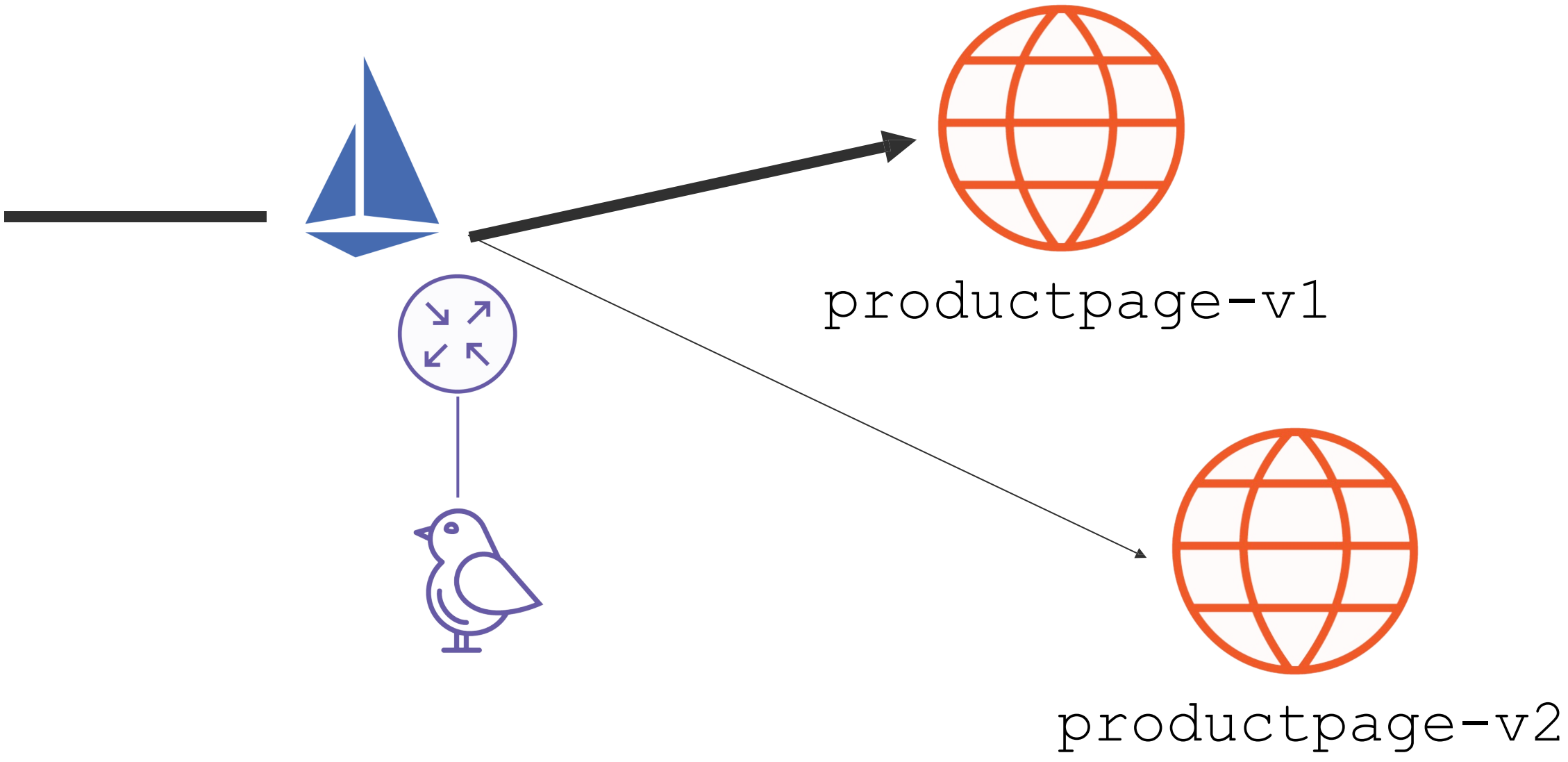

Gateway
hosts: *
VirtualService
host: bookinfo.com
destination: productpage
subset: v1
weight: 50
destination: productpage
subset: v2
weight: 50
DestinationRule
subset: v1 labels:
version=v1
subset: v2
labels: version=v2
Pod
labels: app=productpage
version=v1
Pod
labels: app=productpage
version=v1
Pod
NEW
labels: app=productpage
version=v2
Pod
NEW
labels: app=productpage
version=v2


Gateway
hosts: *
VirtualService
host: bookinfo.com
destination: productpage
subset: v1
weight: 0
destination: productpage
subset: v2
weight: 100
DestinationRule
subset: v1 labels:
version=v1
subset: v2
labels: version=v2
Pod
labels: app=productpage
version=v1
Pod
labels: app=productpage
version=v1
Pod
NEW
labels: app=productpage
version=v2
Pod
NEW
labels: app=productpage
version=v2

Demo

Canary deployment

- Traffic weighted to v1
- Shift traffic to v2
- Canary with sticky sessions


productpage-v1
productpage-v2

Canary Deployment

VirtualService-70-30.yaml

```
  http:
    - route:
        - destination:
            host: productpage
            subset: v1
          weight: 70
-       destination:
            host: productpage
            subset: v2
          weight: 30
```

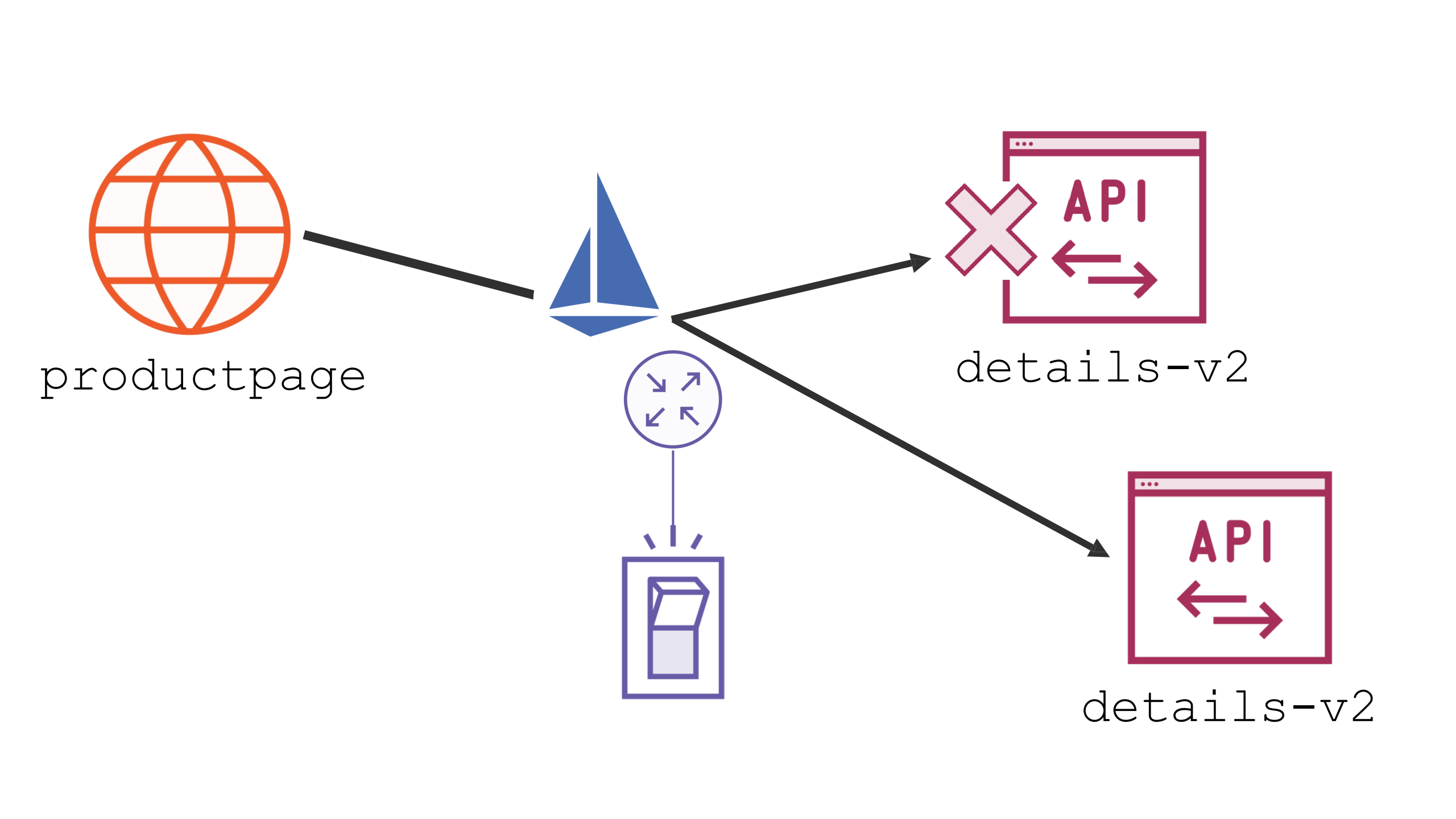
VirtualService-5-95.yaml

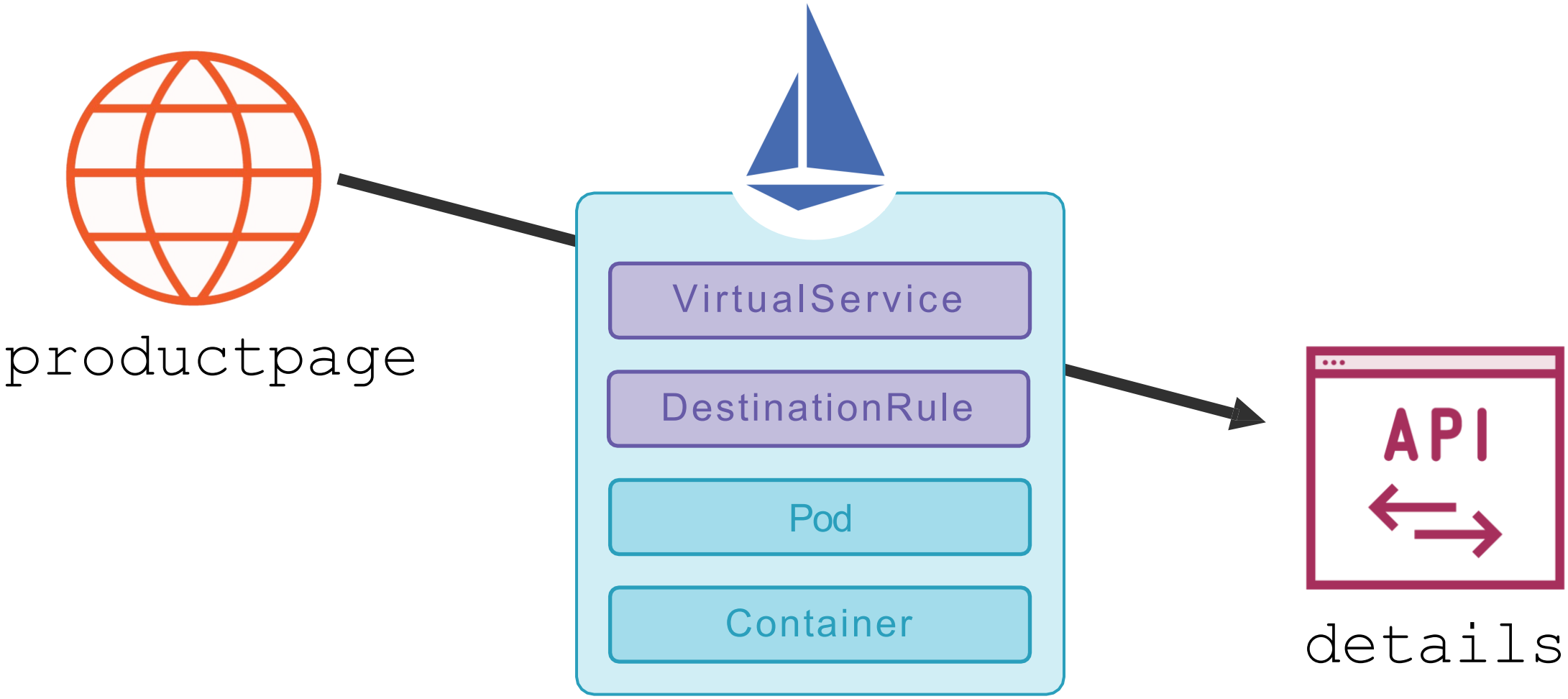
```
  http:
    - route:
        - destination:
            host: productpage
            subset: v1
          weight: 5
        - destination:
            host: productpage
            subset: v2
          weight: 95
```

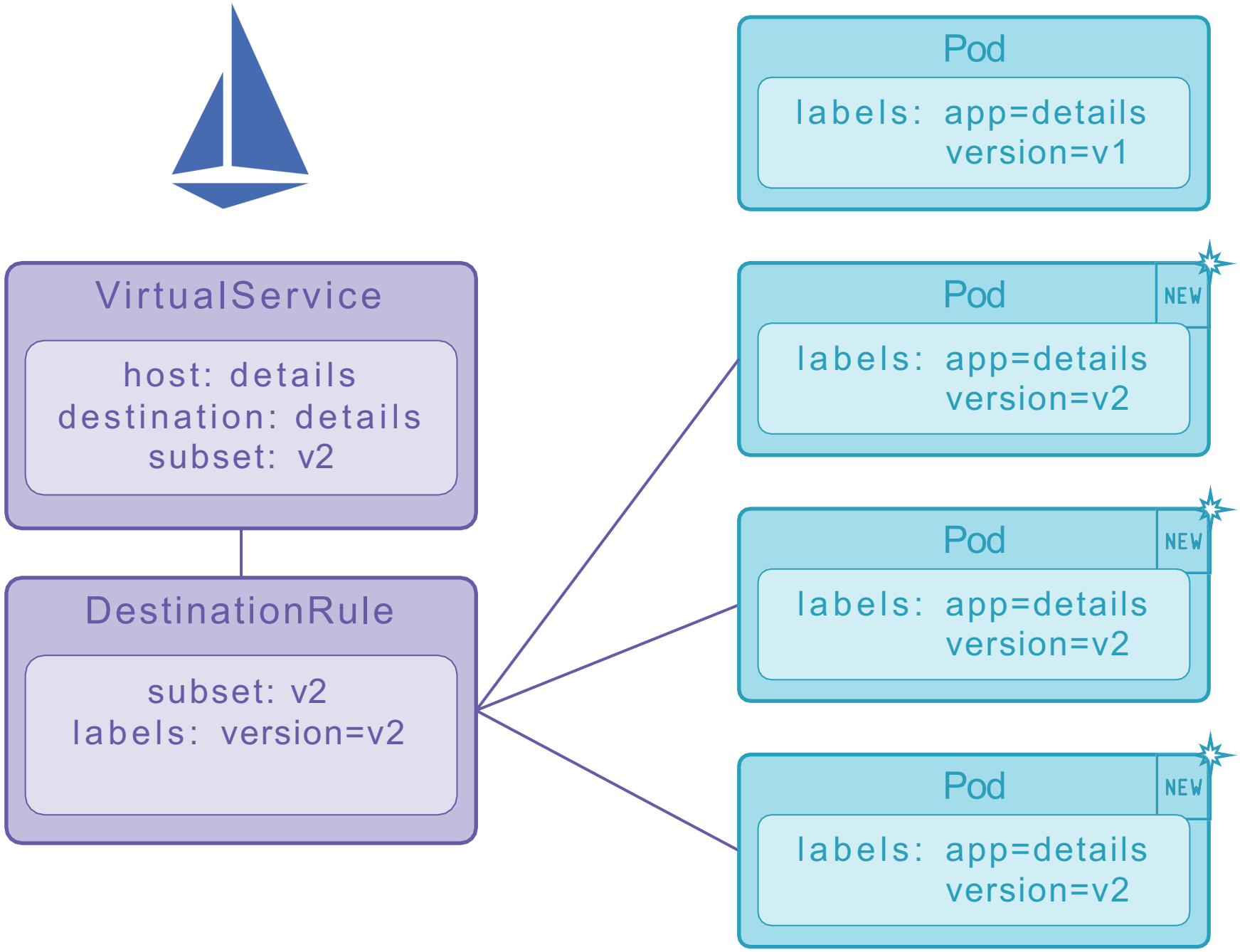
Canary Deployment with Sticky Sessions

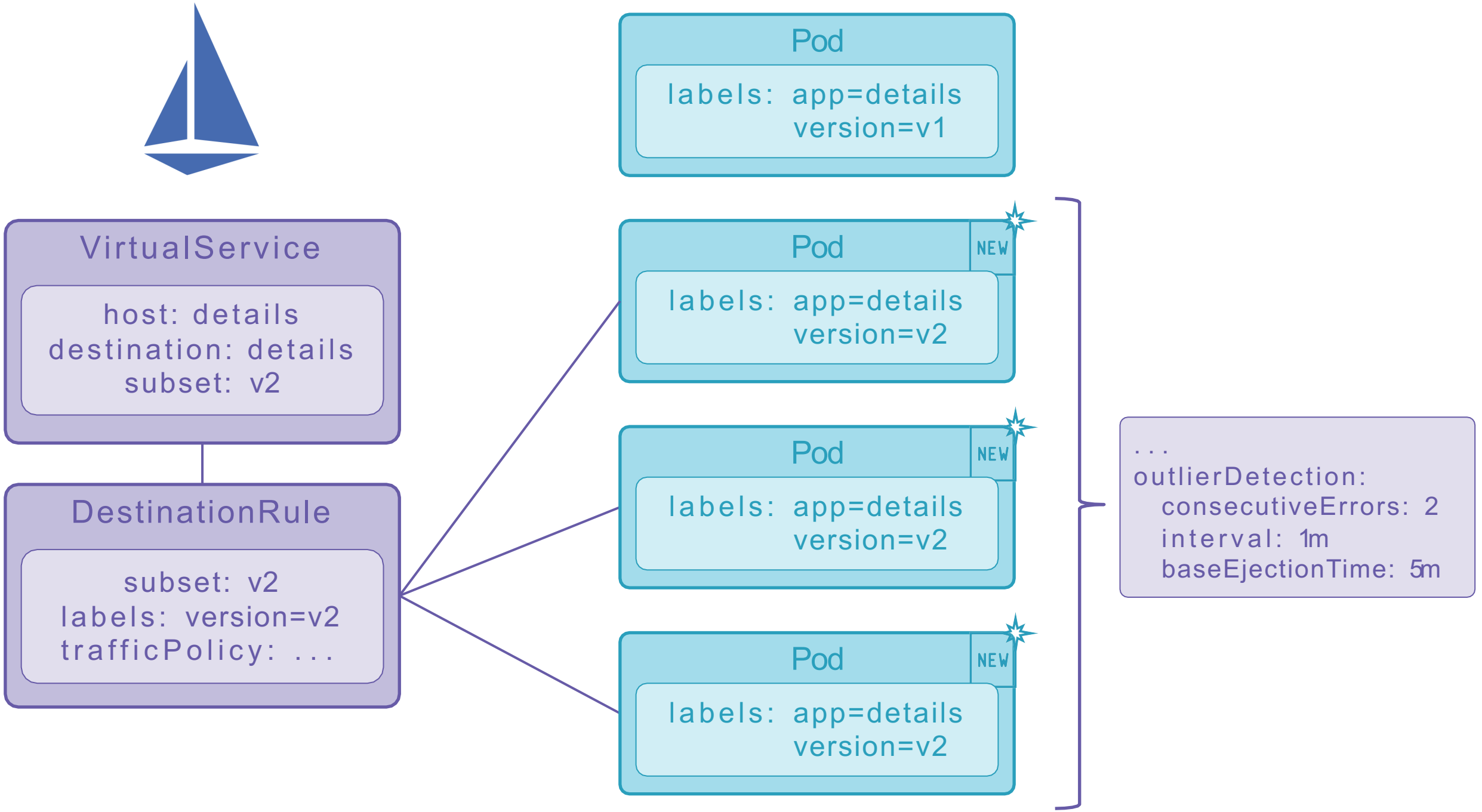
VirtualService.yaml

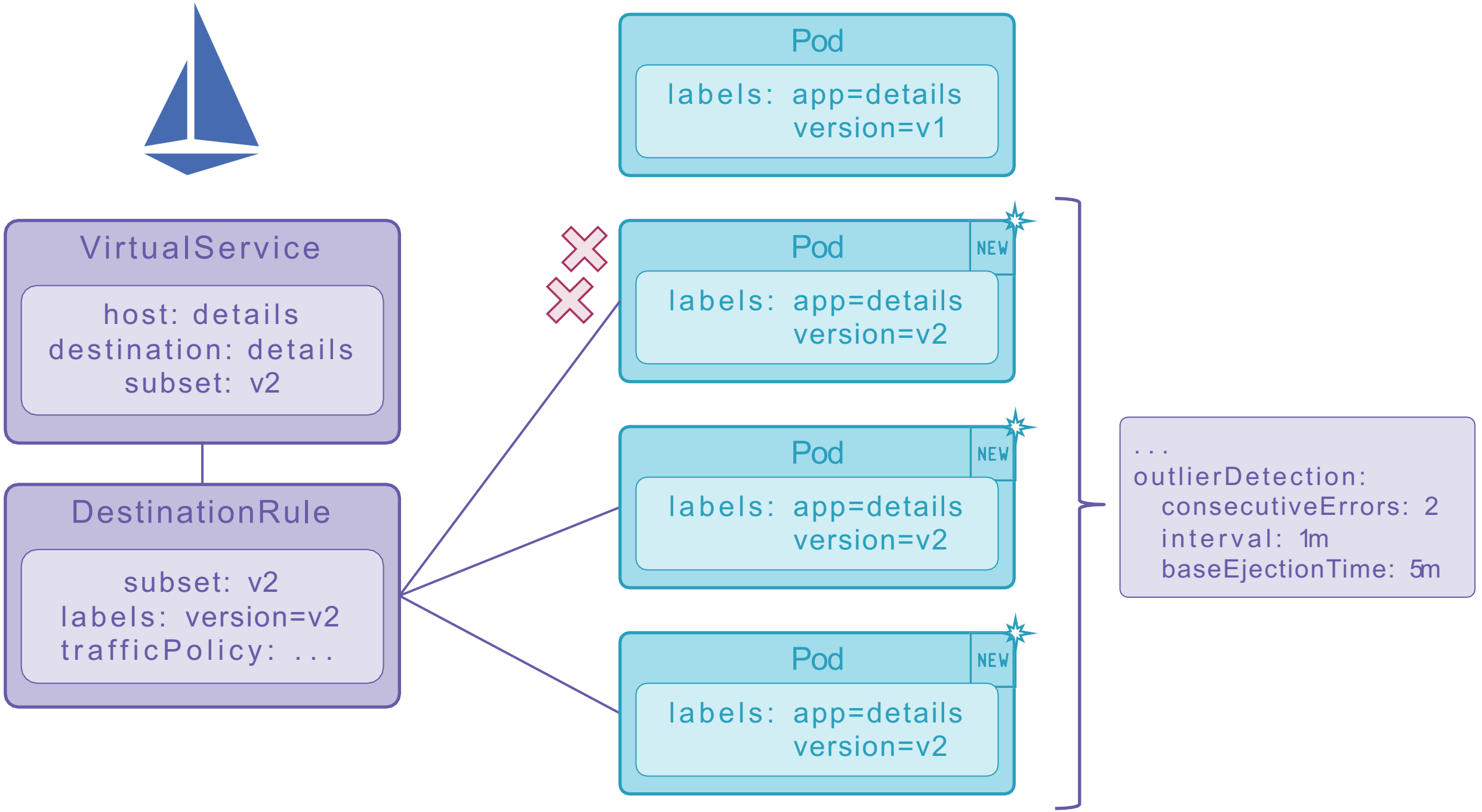
```yaml
http:
  - match:
      - headers:
          cookie:
            regex: "^(.*?;)?(product-page=v2)(;.*)?$"
    route:
      - destination:
          host: productpage
          subset: v2
  - route:
      - destination:
          host: productpage
          subset: v1
        weight: 70
-       destination:
          host: productpage
          subset: v2
        weight: 30
```


productpage
API
details-v2
API
details-v2


productpage
VirtualService
DestinationRule
Pod
Container
API
details


VirtualService
host: details
destination: details
subset: v2
DestinationRule
subset: v2
labels: version=v2
Pod
labels: app=details
version=v1
Pod
NEW
labels: app=details
version=v2
Pod
NEW
labels: app=details
version=v2
Pod
NEW
labels: app=details
version=v2

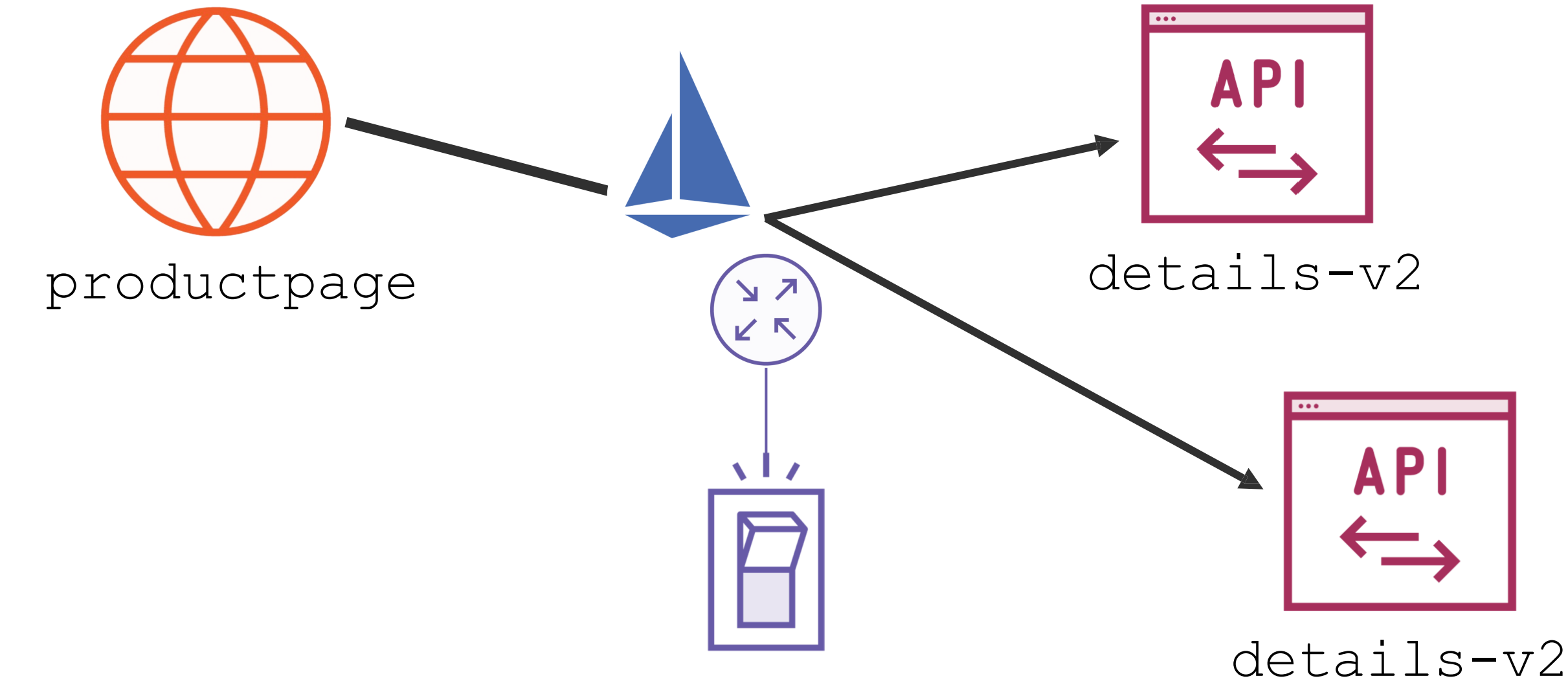

VirtualService
host: details
destination: details
subset: v2
DestinationRule
subset: v2
labels: version=v2
trafficPolicy: ...
Pod
labels: app=details
version=v1
Pod
NEW
labels: app=details
version=v2
Pod
NEW
labels: app=details
version=v2
Pod
NEW
labels: app=details
version=v2
...
outlierDetection:
consecutiveErrors: 2
interval: 1m
baseEjectionTime: 5m

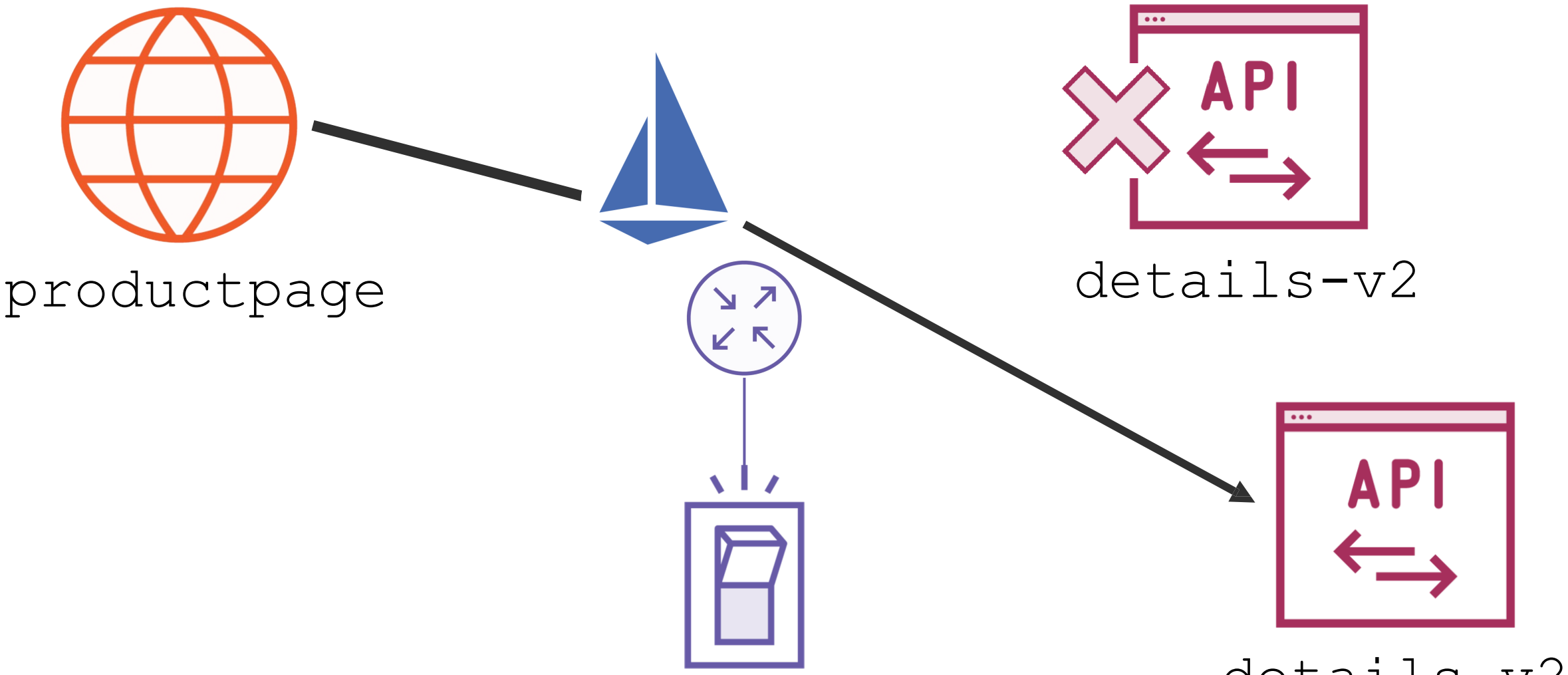

VirtualService
host: details
destination: details
subset: v2
DestinationRule
subset: v2
labels: version=v2
trafficPolicy: ...
Pod
labels: app=details
version=v1
Pod
NEW
labels: app=details
version=v2
Pod
NEW
labels: app=details
version=v2
Pod
NEW
labels: app=details
version=v2
...
outlierDetection:
consecutiveErrors: 2
interval: 1m
baseEjectionTime: 5m

Demo

Circuit breaker

- Deploy service update
- Failing instances
- Route with outlier detection


productpage
API
details-v2
API
details-v2


productpage
API
details-v2
API
details-v2

Circuit Breaker with Outlier Detection

DestinationRule.yaml

```yaml
spec:
  host: details
  subsets:
    - name: v1
      labels:
        version: v1
    - name: v2
      labels:
        version: v2
      trafficPolicy:
        outlierDetection:
          consecutiveErrors: 2
          interval: 1m
          baseEjectionTime: 5m
          maxEjectionPercent: 100
```

Summary

Managing traffic

- Gateway
- VirtualService
- DestinationRule

Deployment strategies

- Dark launch
- Blue/green
- Canary

Self-healing apps

- Circuit breaker

Up Next:
Securing Communication with Mutual TLS