

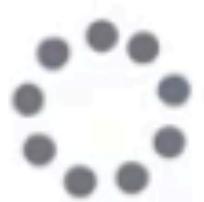
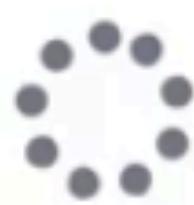
A Journey towards Microservices & Service Mesh

Vishant Shah & Shiddesh Unkalkar

18 April 2022

Monolithic & Microservices

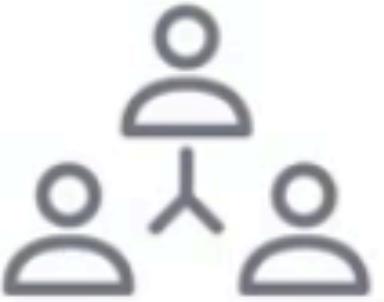
Software Development until the 2000s



Agile Manifesto

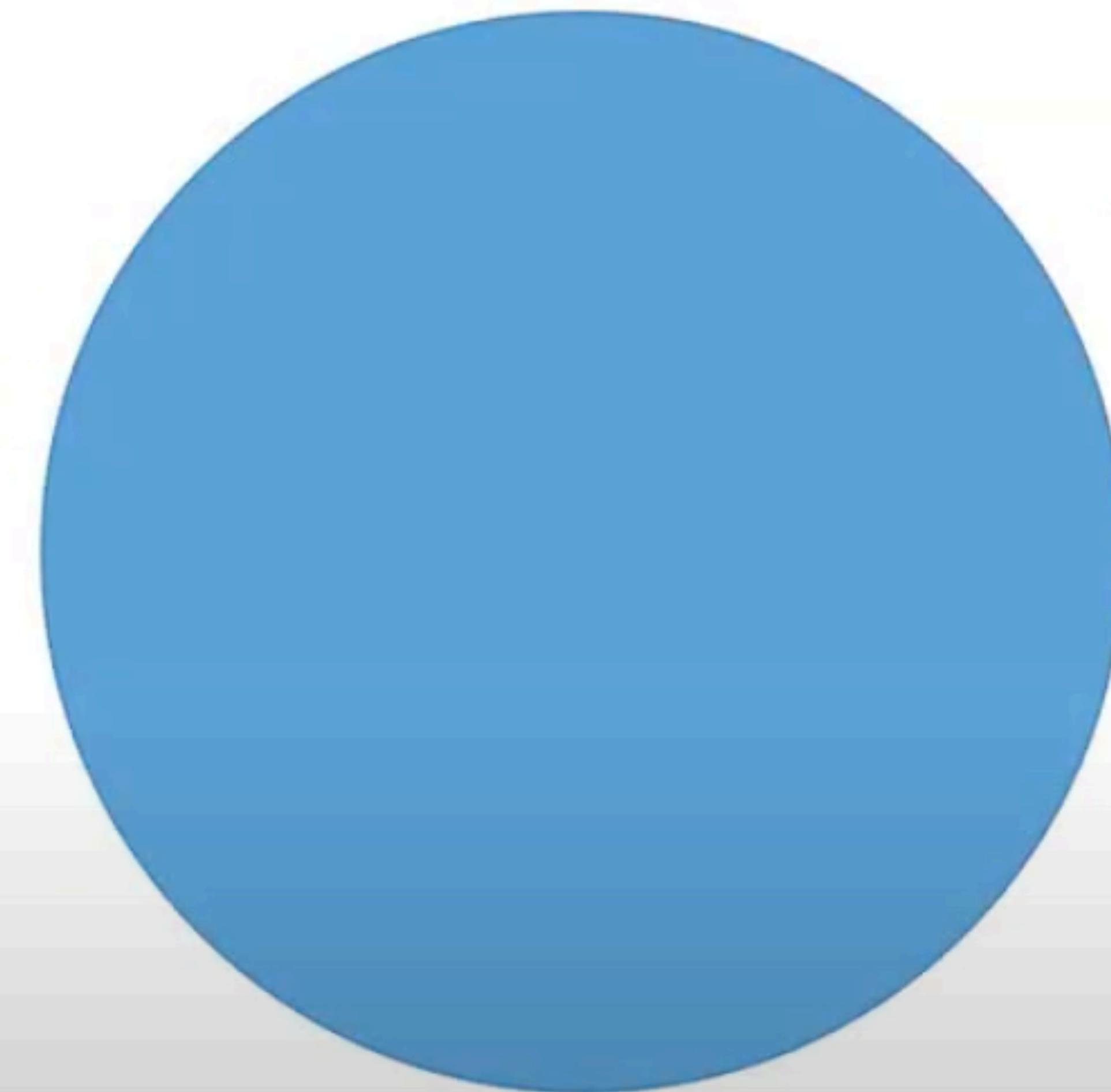
“We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:”

Agile Manifesto

| | | |
|---|---------------------------------------|-----------------------------|
|  | Individuals & Interactions | Processes and Tools |
|  | Working Software | Comprehensive Documentation |
|  | Customer Collaboration | Contract Negotiation |
|  | Responding to Change | Following a plan |

“That is, while there is value in the items on the right, we value the items on the left more.”

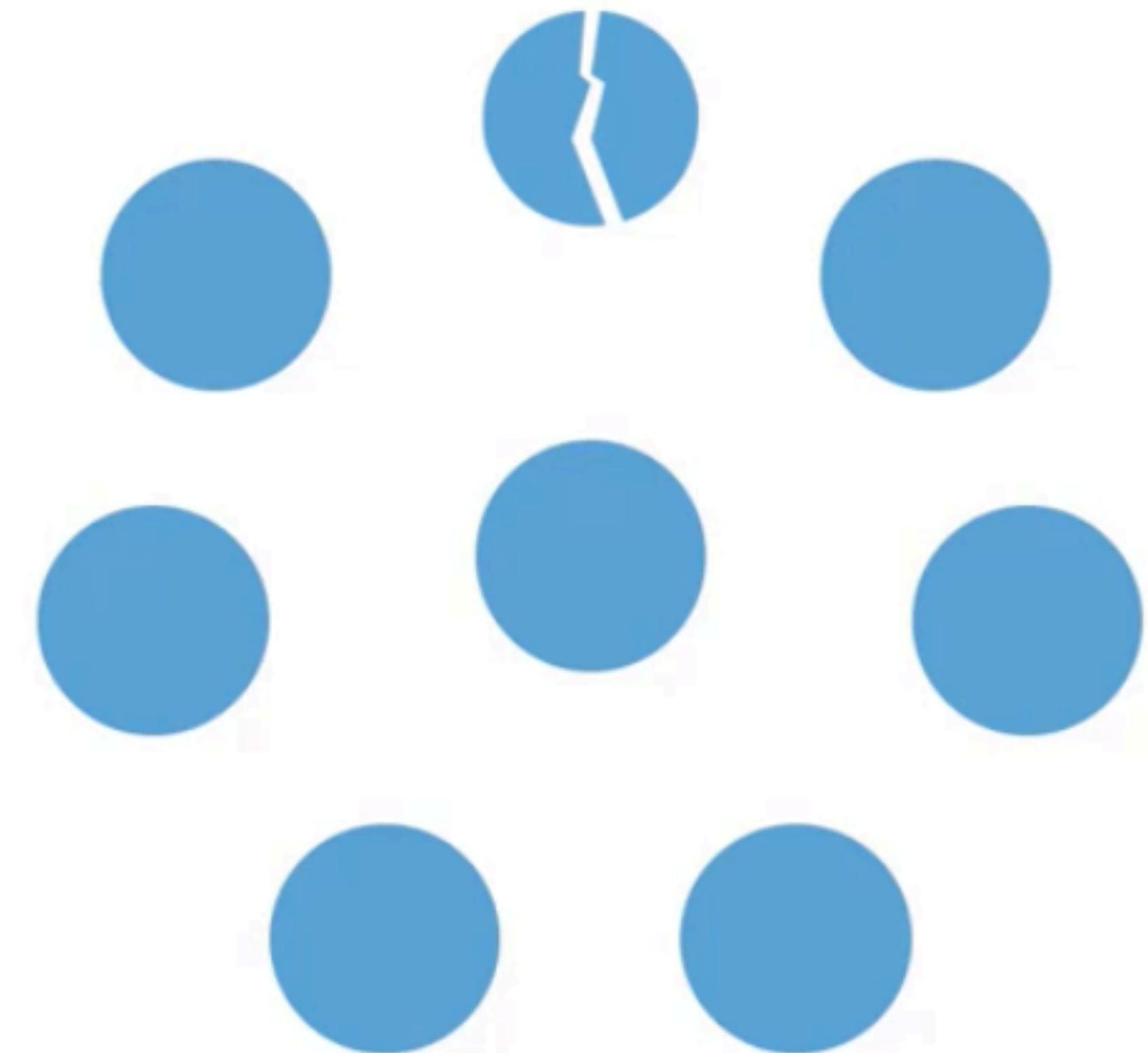
Agile Practices



Agile Practices



Agile Practices



A Monolithic Book Info App



A Monolithic Book Info App

BookInfo Sample

Sign in

The Comedy of Errors

Summary: [Wikipedia Summary](#): The Comedy of Errors is one of **William Shakespeare's** early plays. It is his shortest and one of his most farcical comedies, with a major part of the humour coming from slapstick and mistaken identity, in addition to puns and word play.

Book Details

Type:
paperback

Pages:
200

Publisher:
PublisherA

Language:
English

ISBN-10:
1234567890

ISBN-13:
123-1234567890

Book Reviews

An extremely entertaining play by Shakespeare. The slapstick humour is refreshing!

— Reviewer1

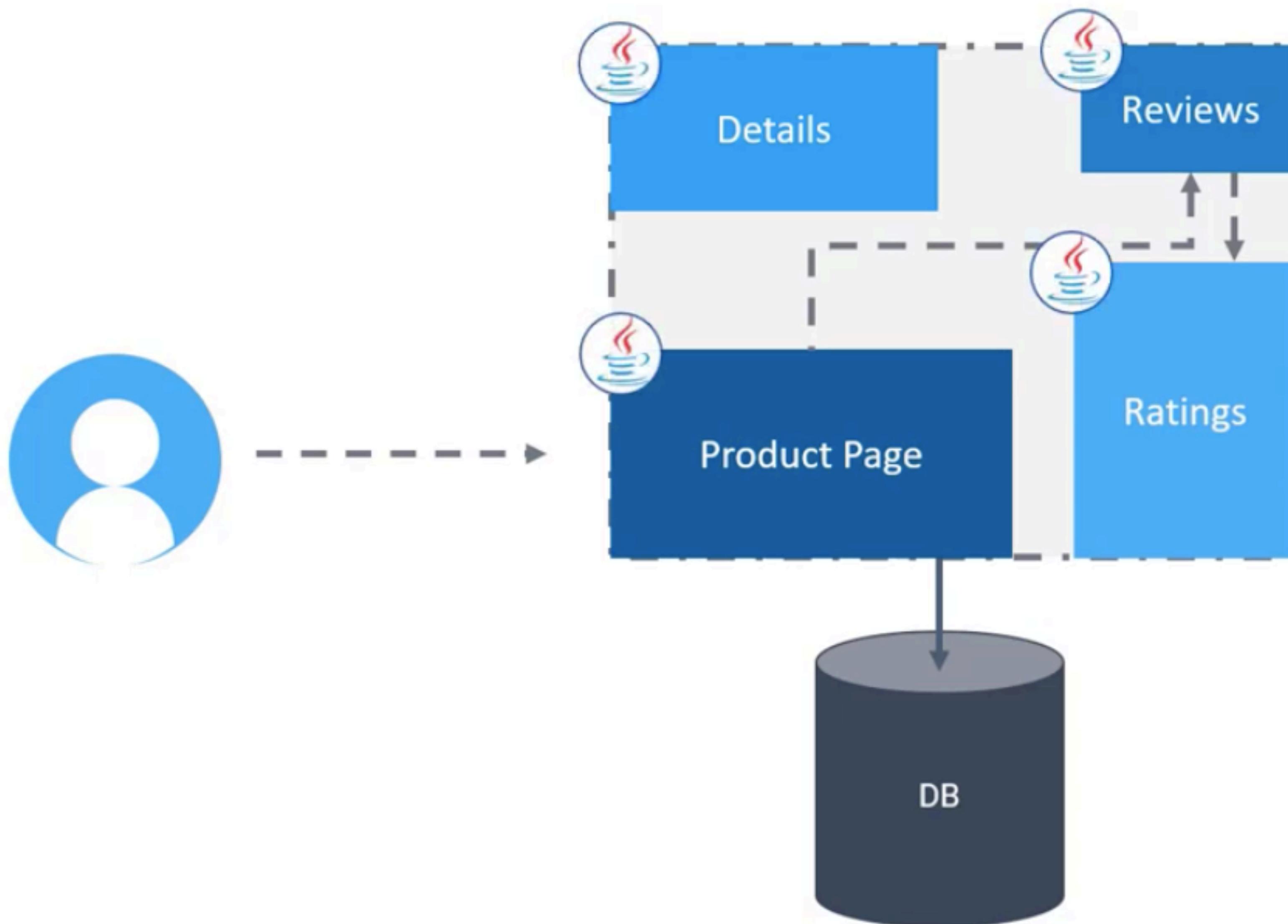


Absolutely fun and entertaining. The play lacks thematic depth when compared to other plays by Shakespeare.

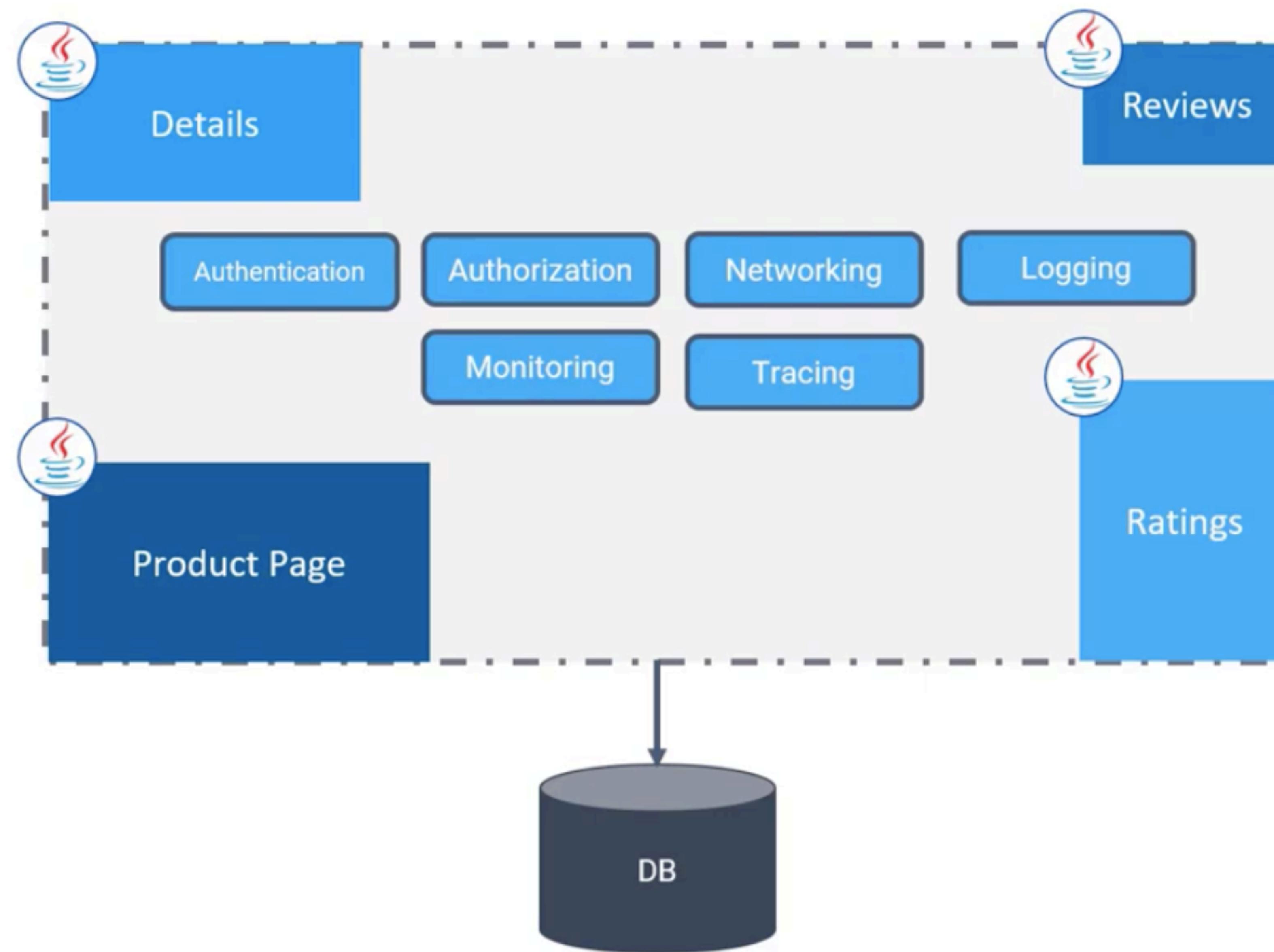
— Reviewer2



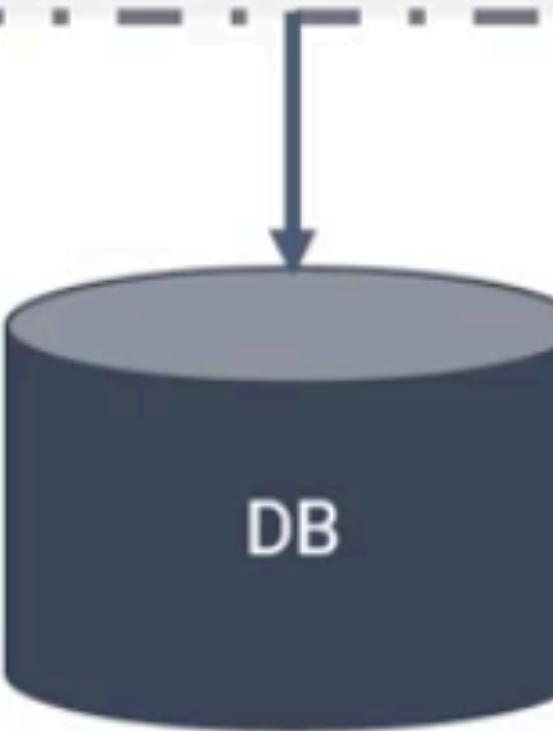
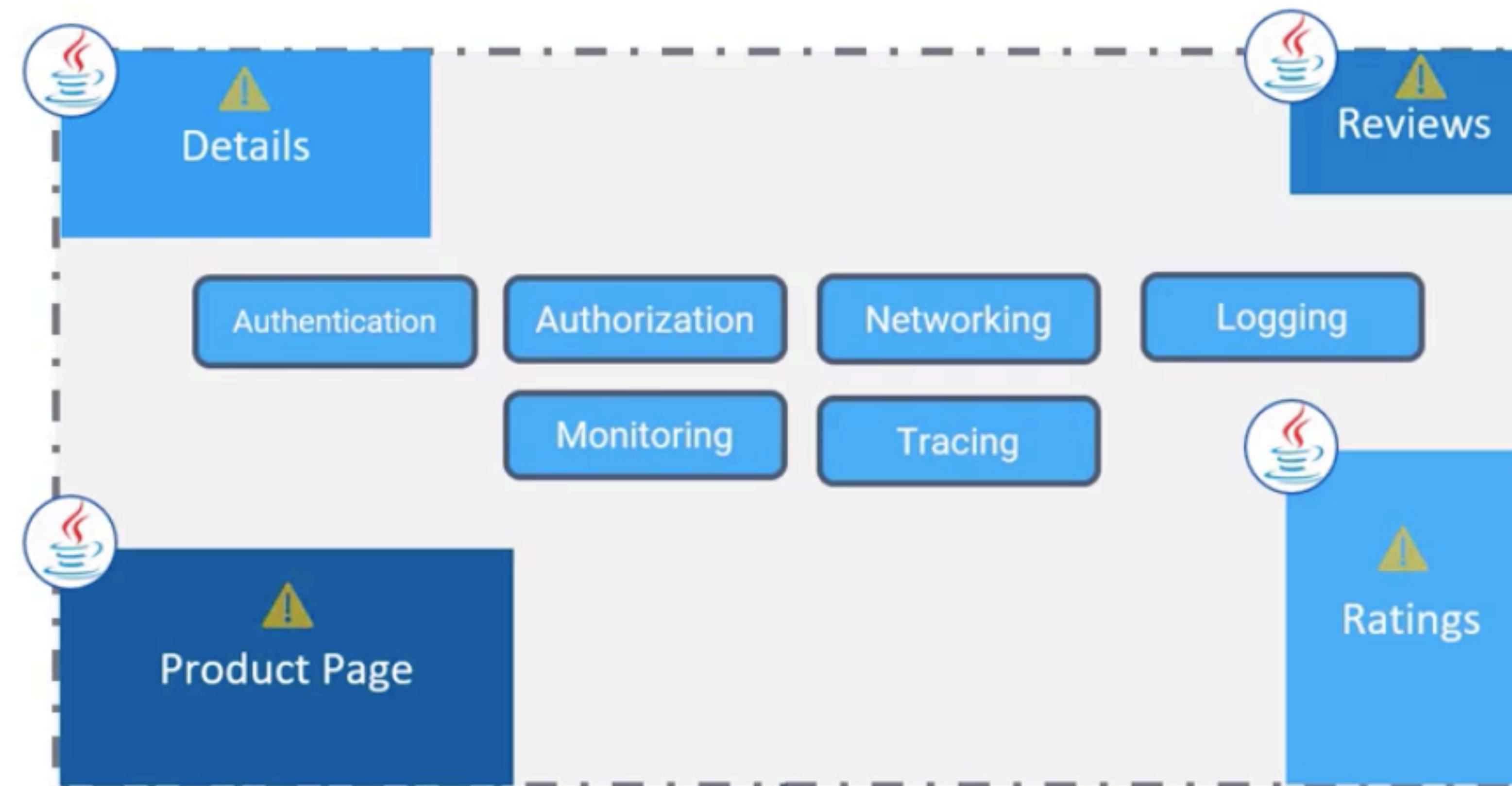
A Monolithic Book Info App



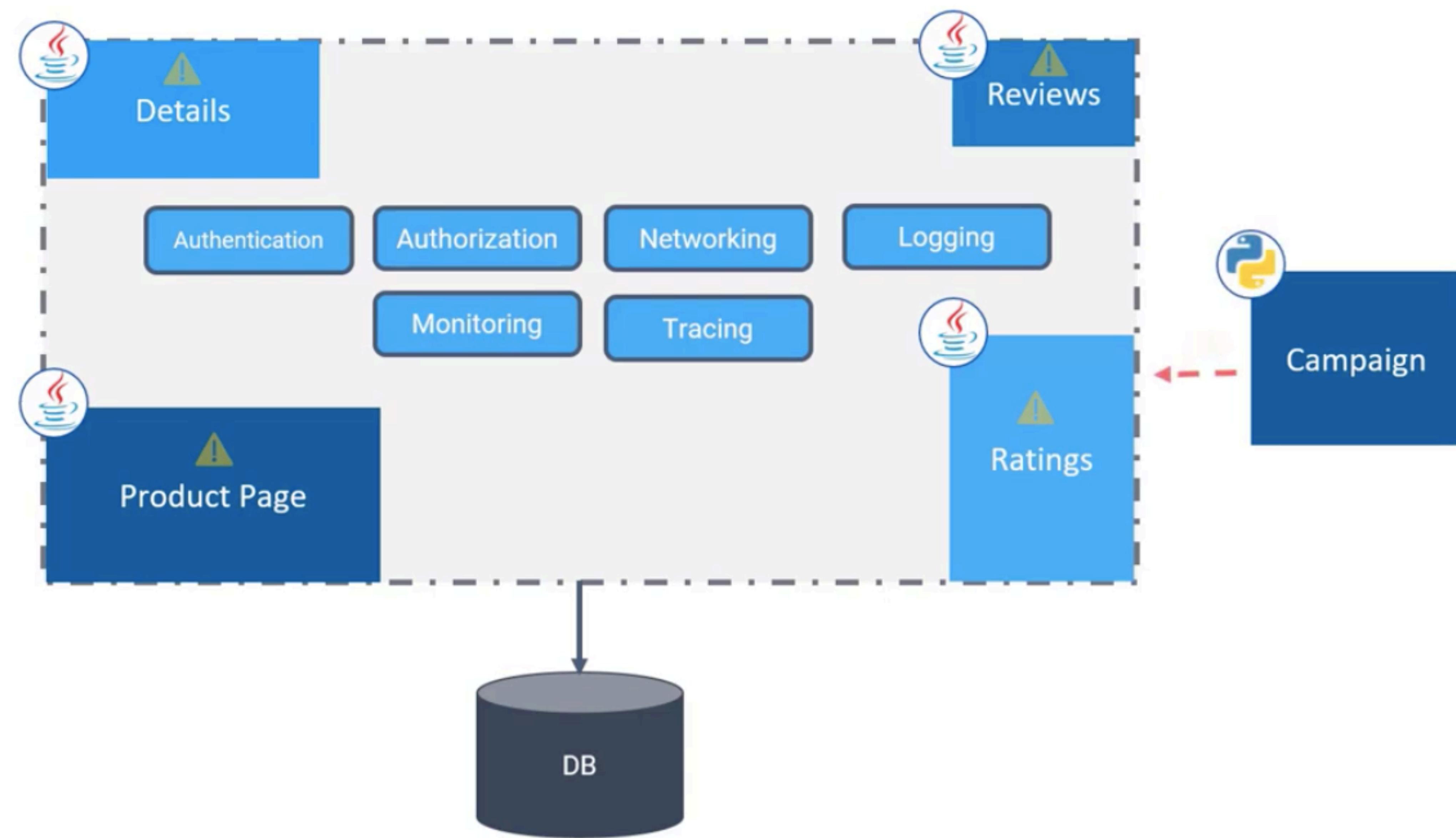
A Monolithic Book Info App



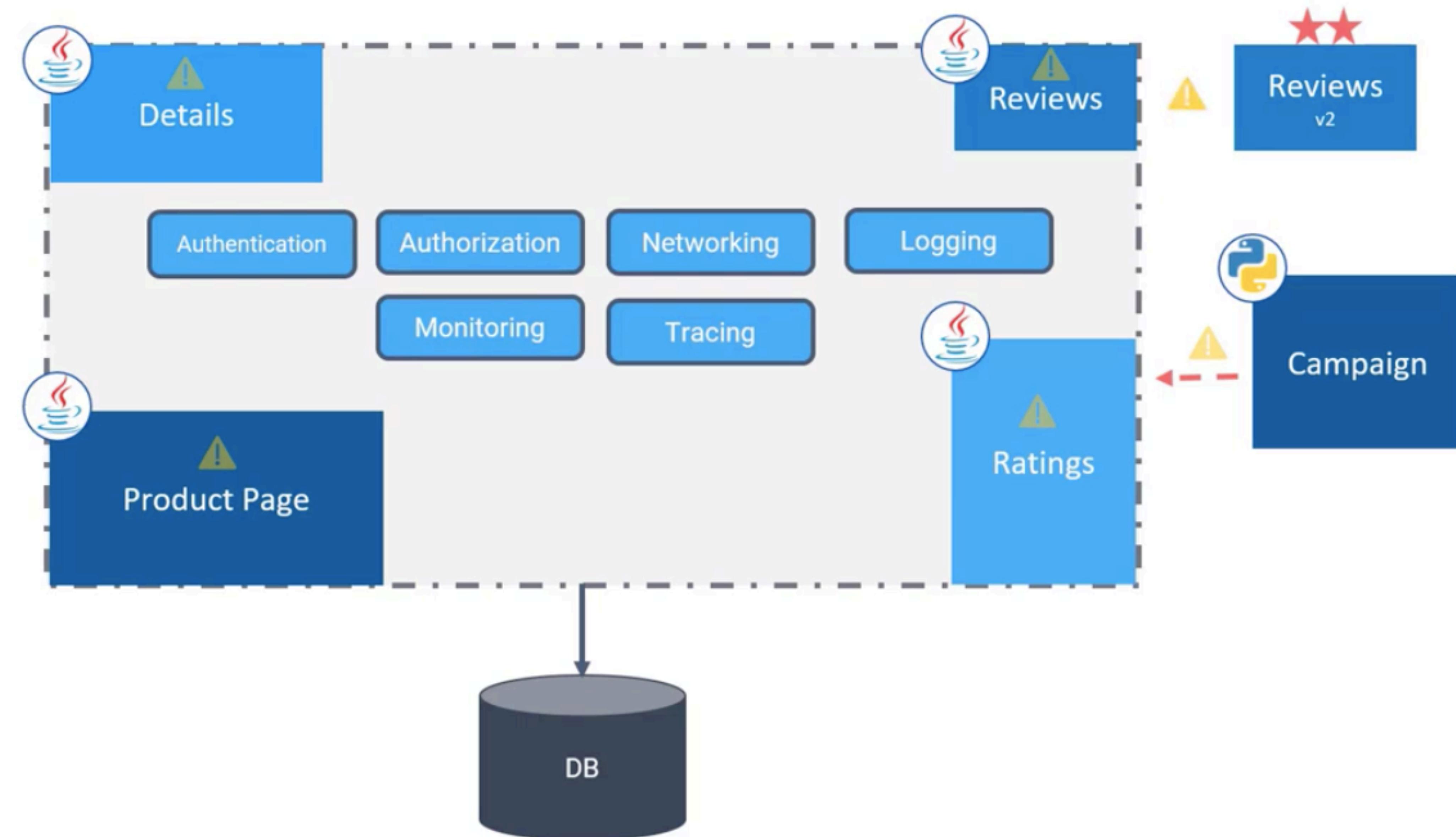
A Monolithic Book Info App



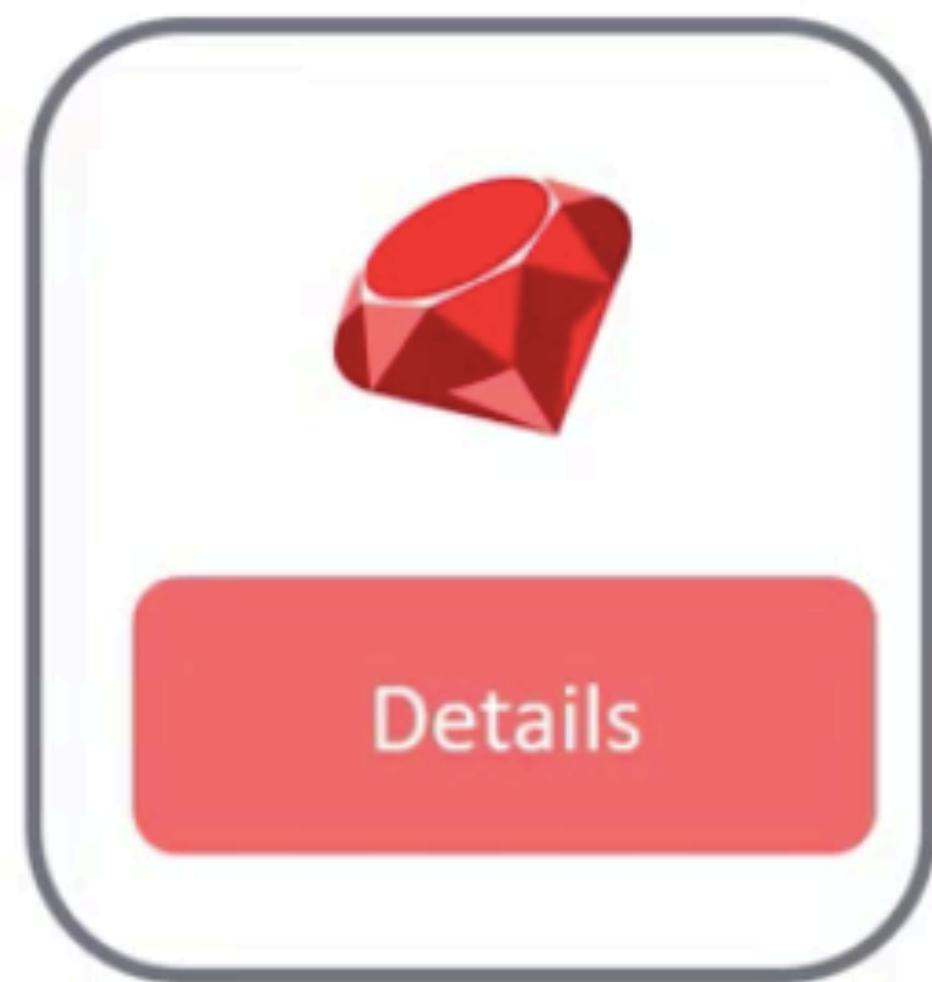
A Monolithic Book Info App



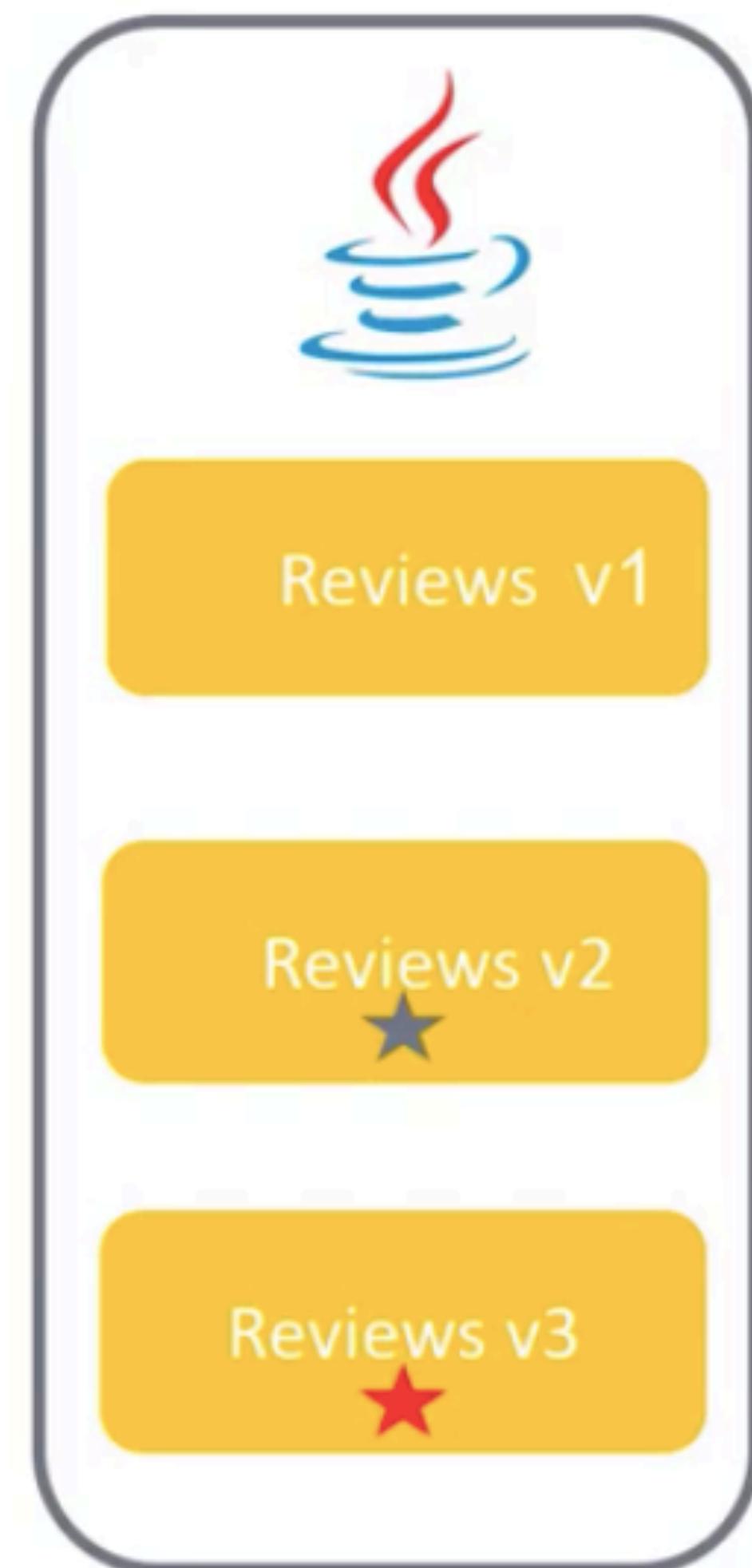
A Monolithic Book Info App



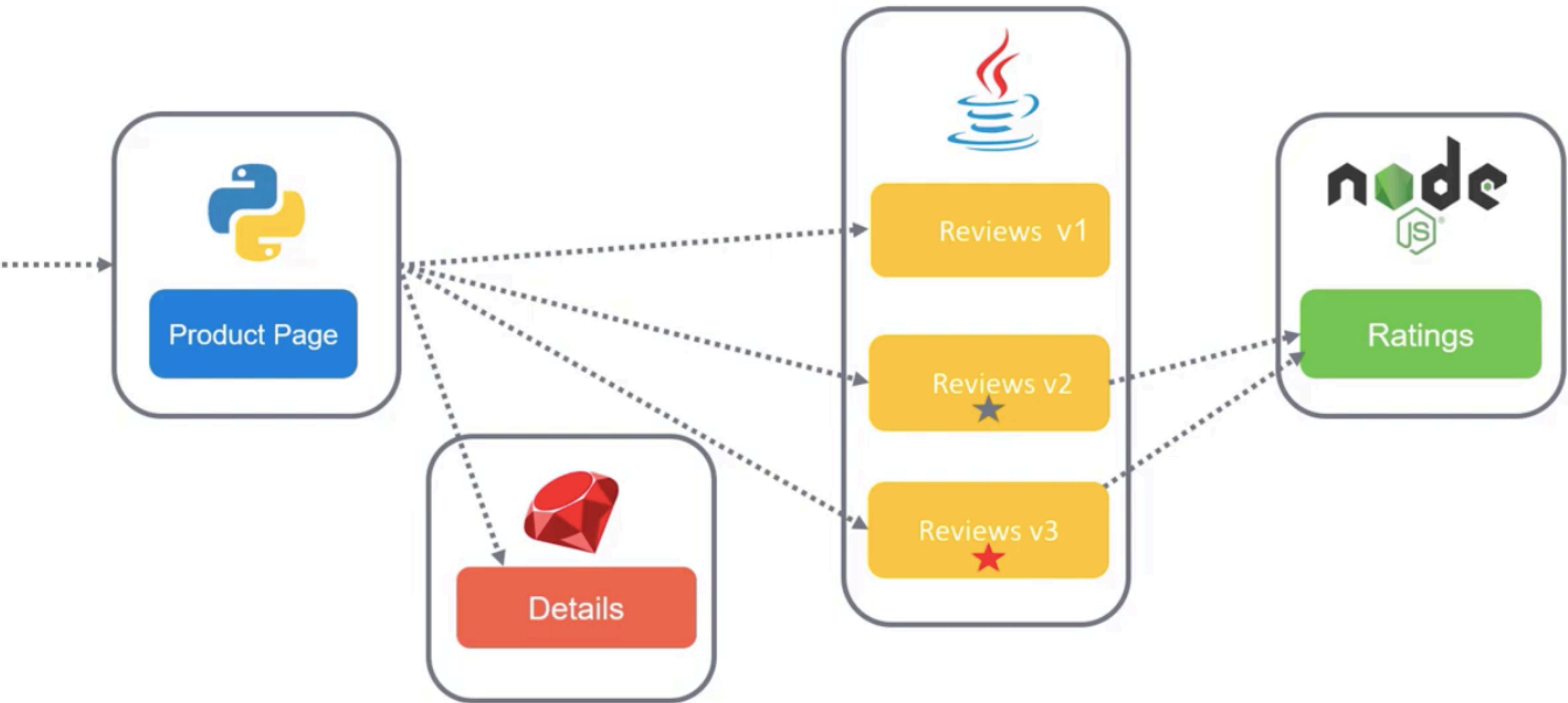
A Microservices Book Info App



A Microservices Book Info App



A Microservices Book Info App



Pros of Microservices



Scalability



Faster, smaller releases



**Technology and language agnostic
Development lifecycle**

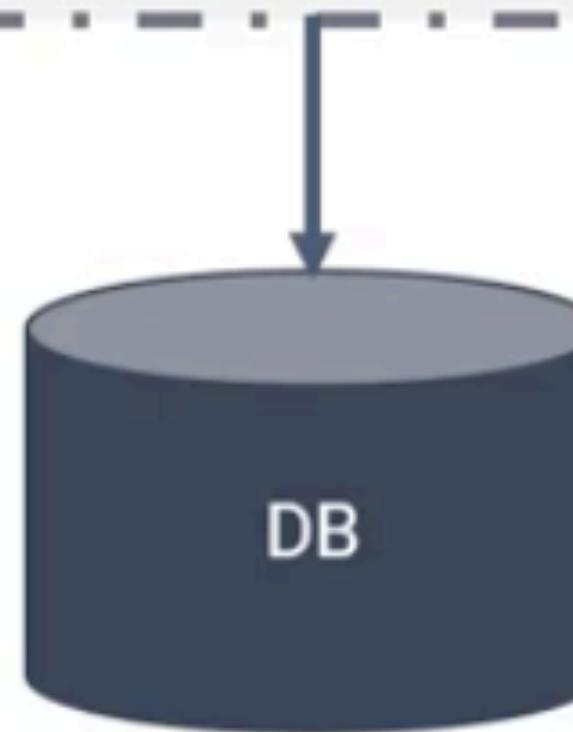
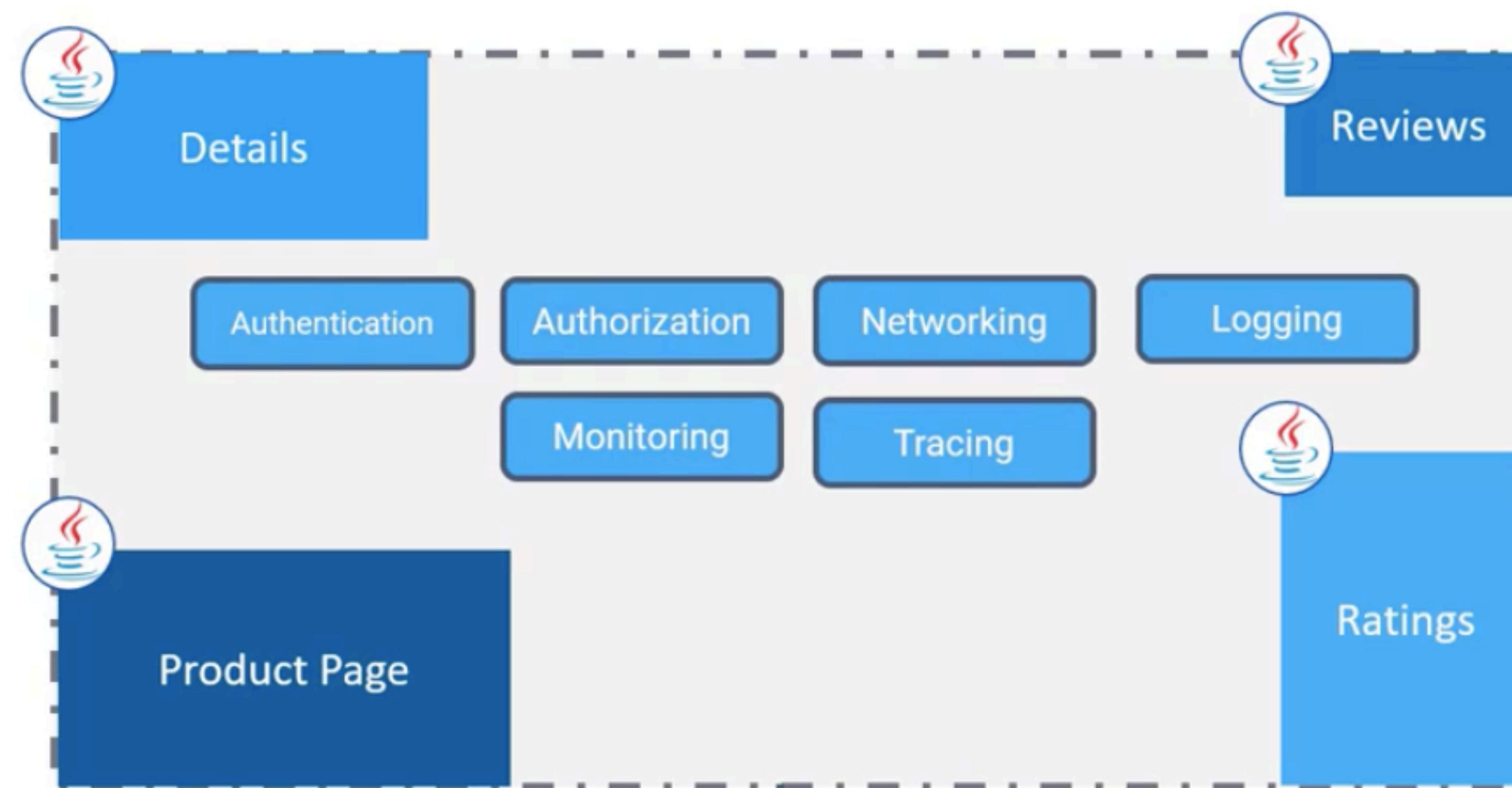


System resiliency and isolation



**Independent and easy
to understand services**

A Monolithic Book Info App



A Microservices Book Info App

Authentication

Authorization

Networking

Logging

Monitoring

Tracing



Product Page



Details

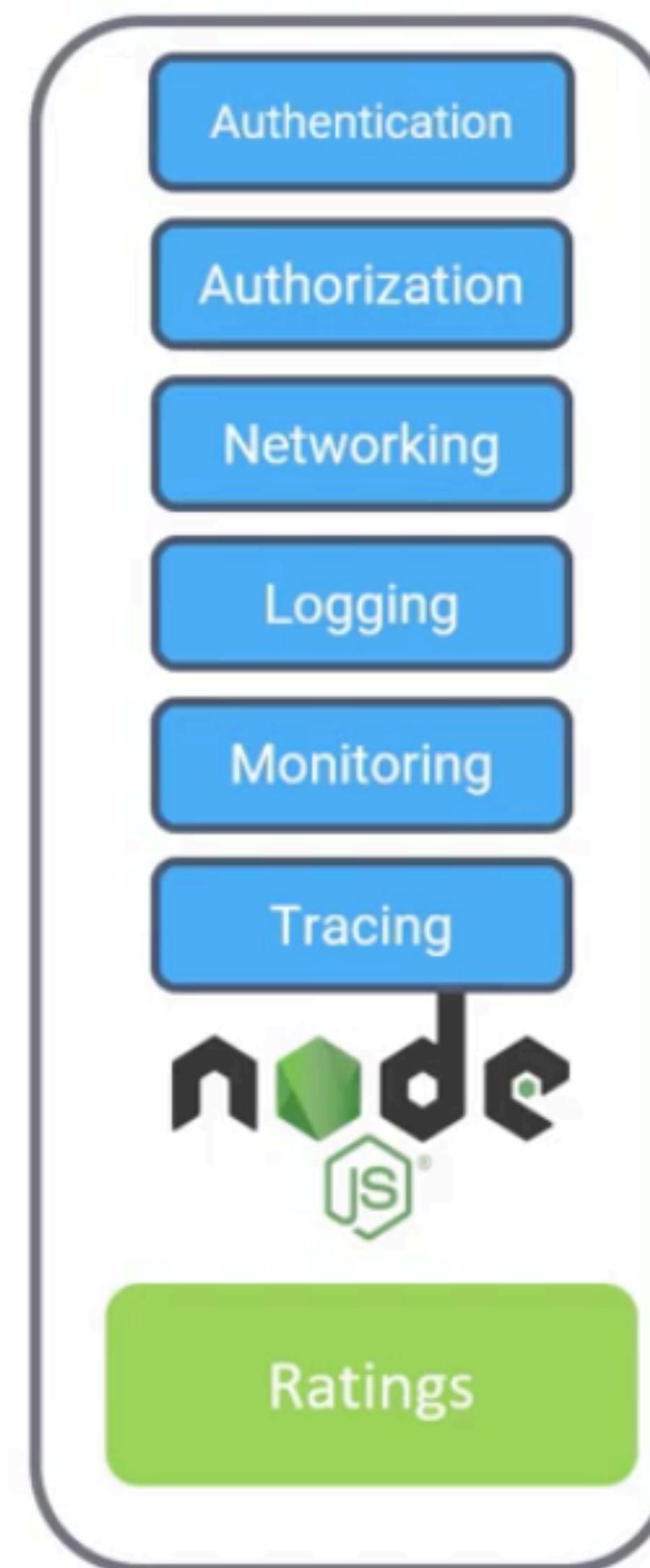
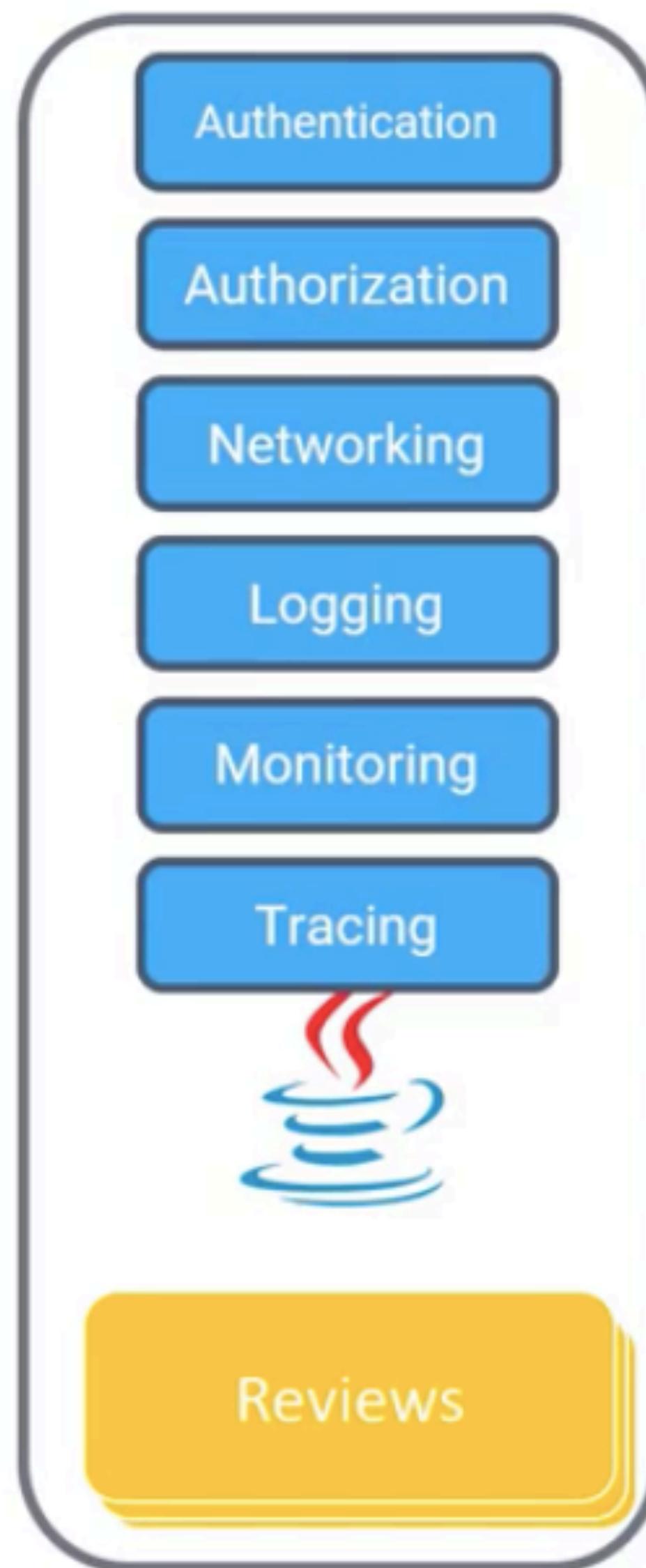
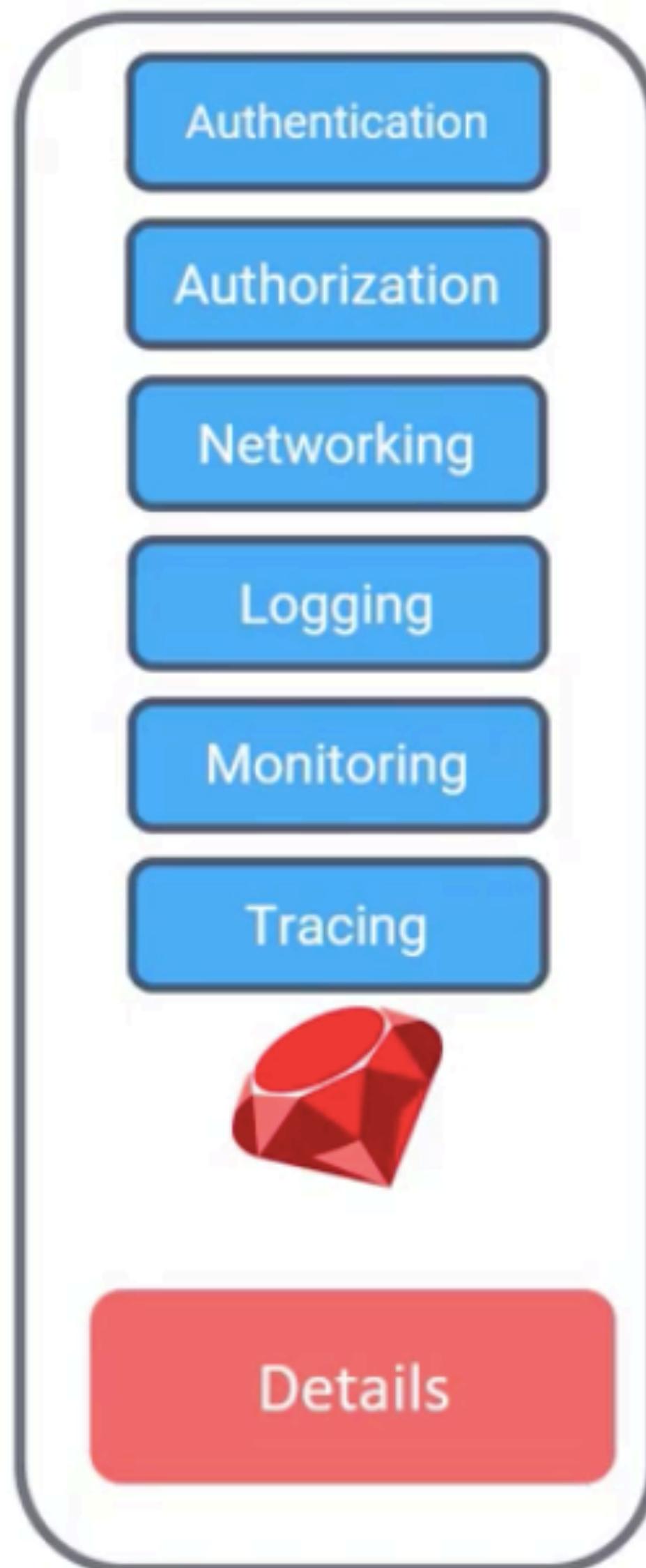
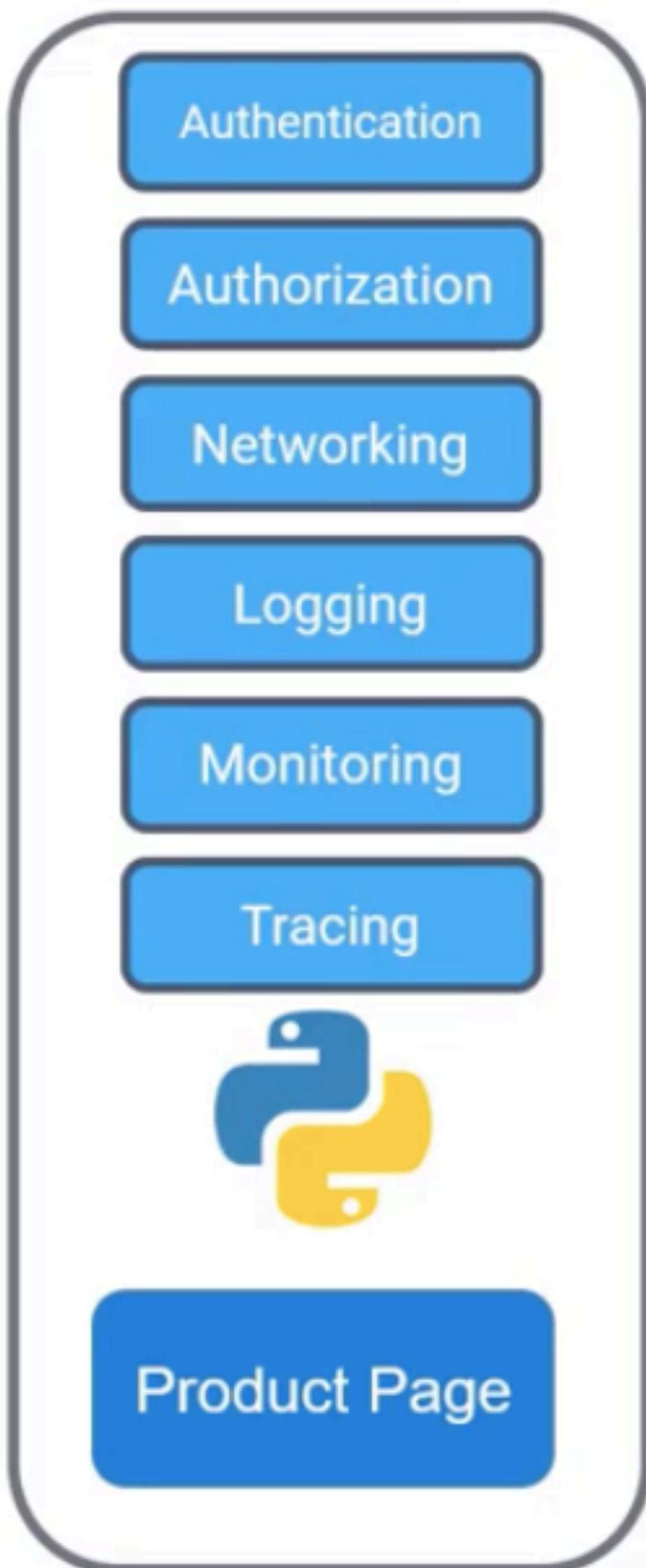


Reviews



Ratings

A Problem: Fat Microservices



Cons of Microservices



Complex Service Networking



Security

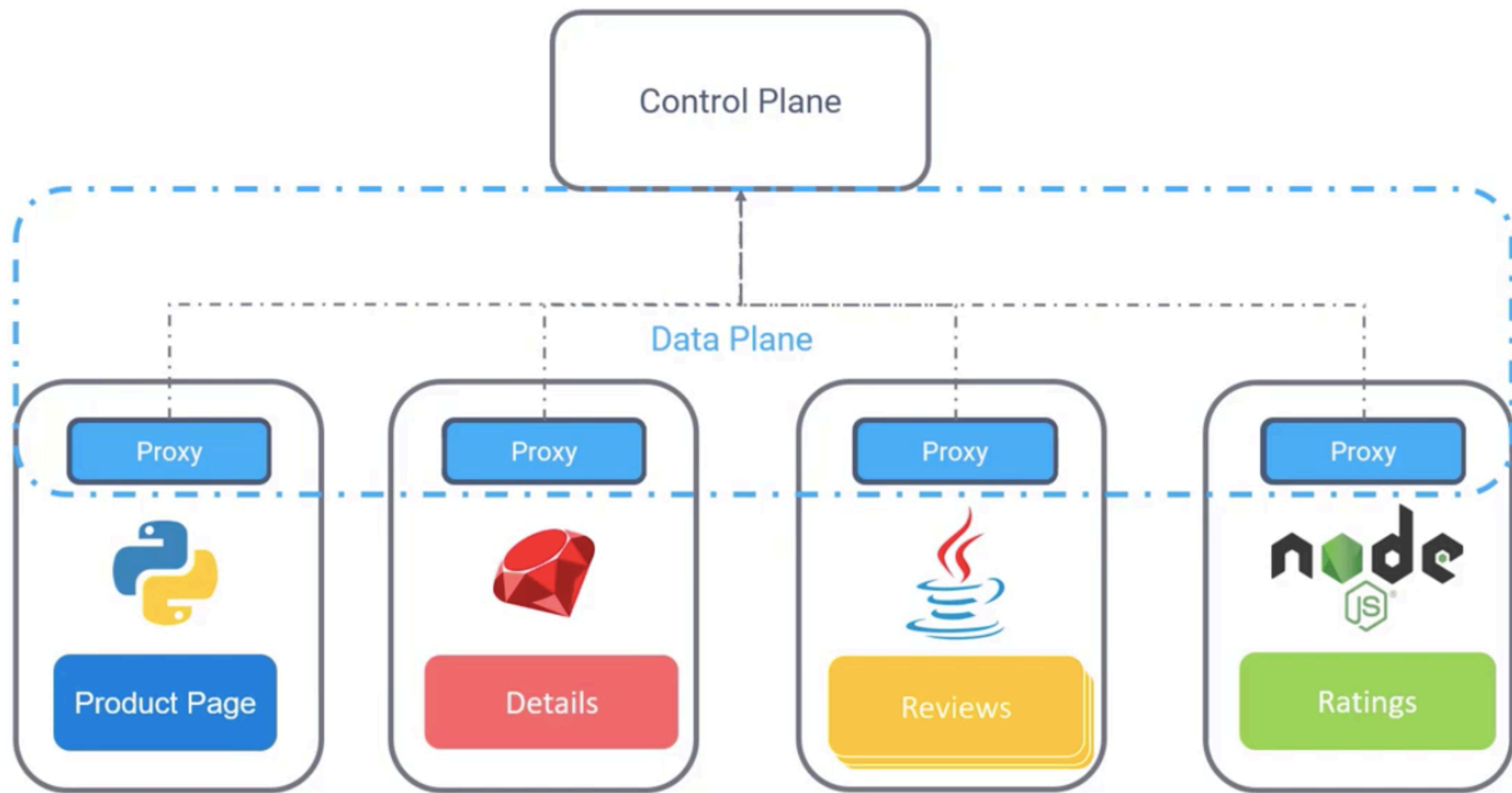


Observability



**Overload for
Traditional Operation Models**

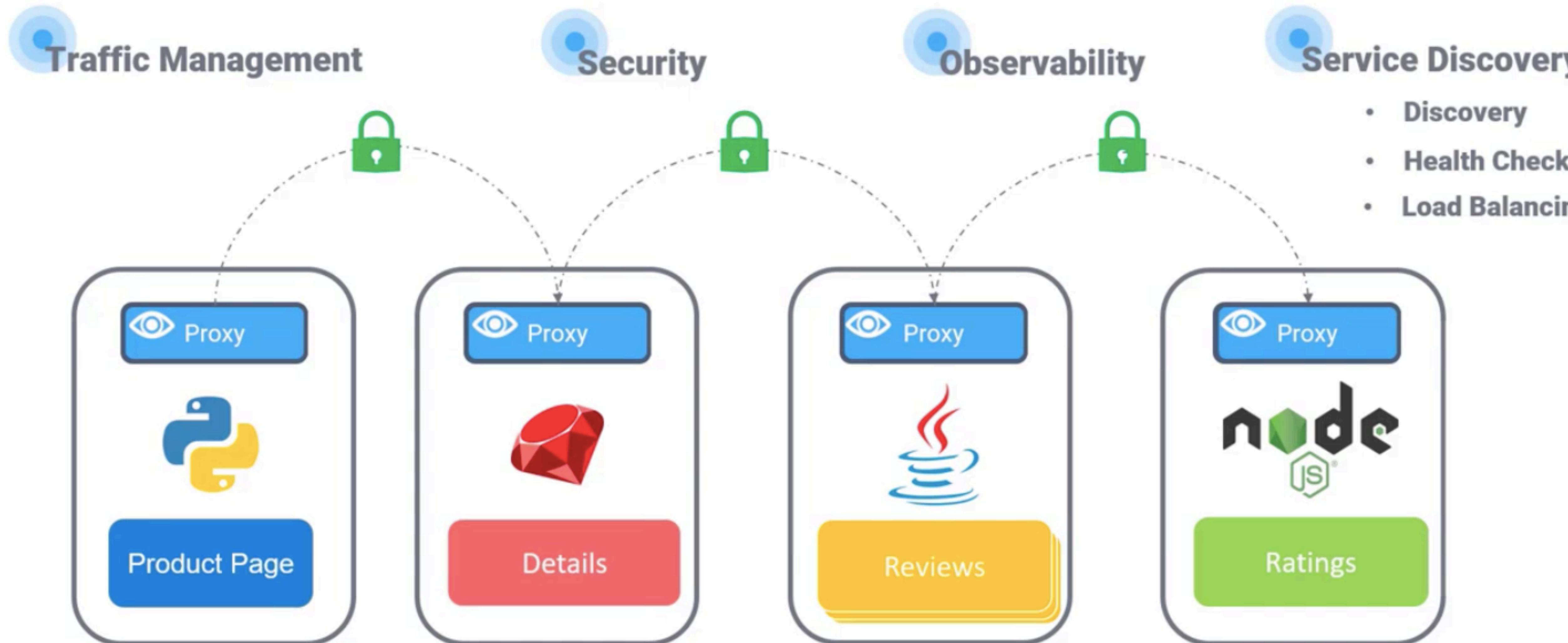
Service Mesh



What is Service Mesh?

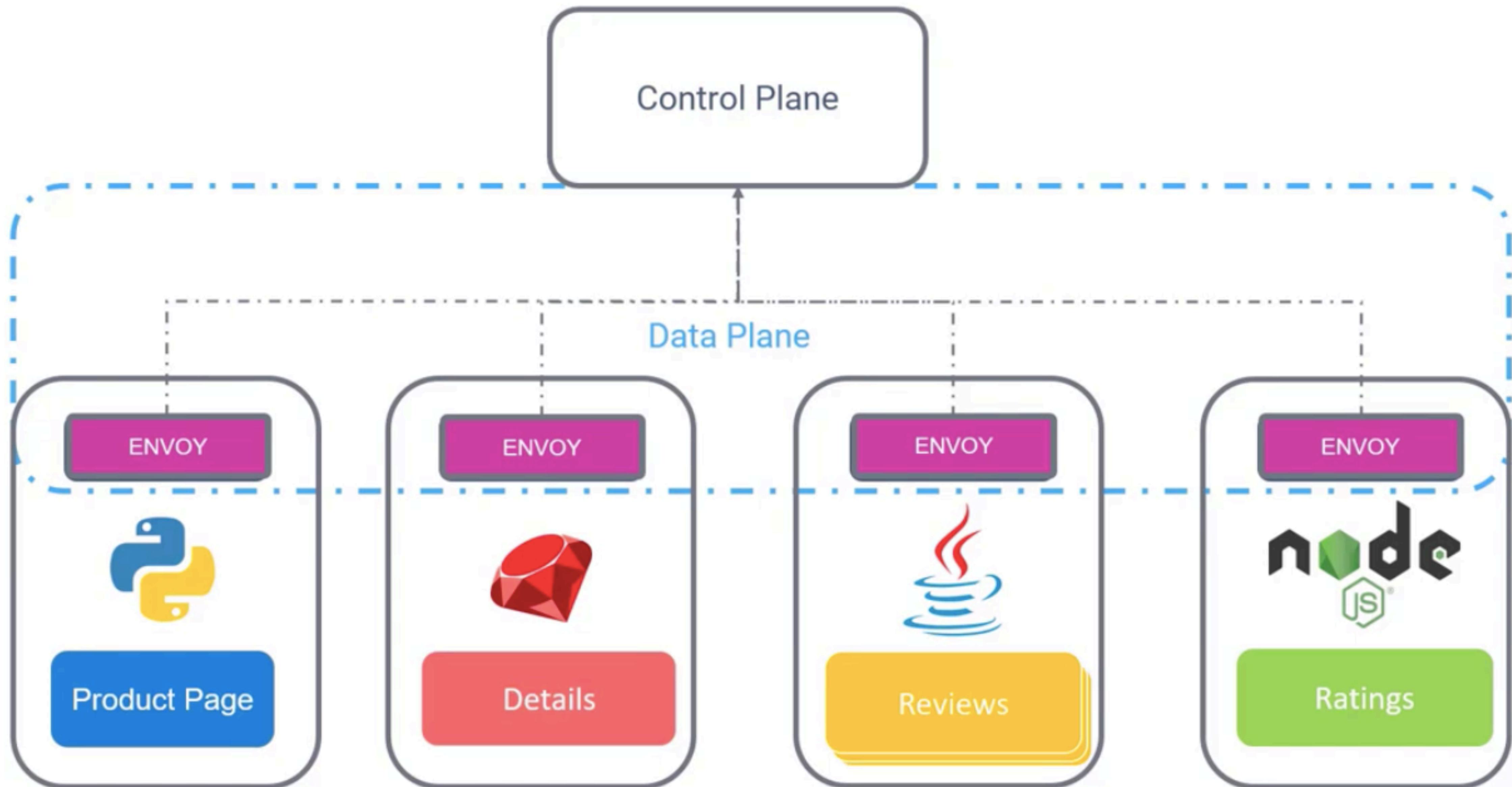
It is a dedicated and configurable infrastructure layer that handles the communication between services without having to change the code in a microservice architecture.

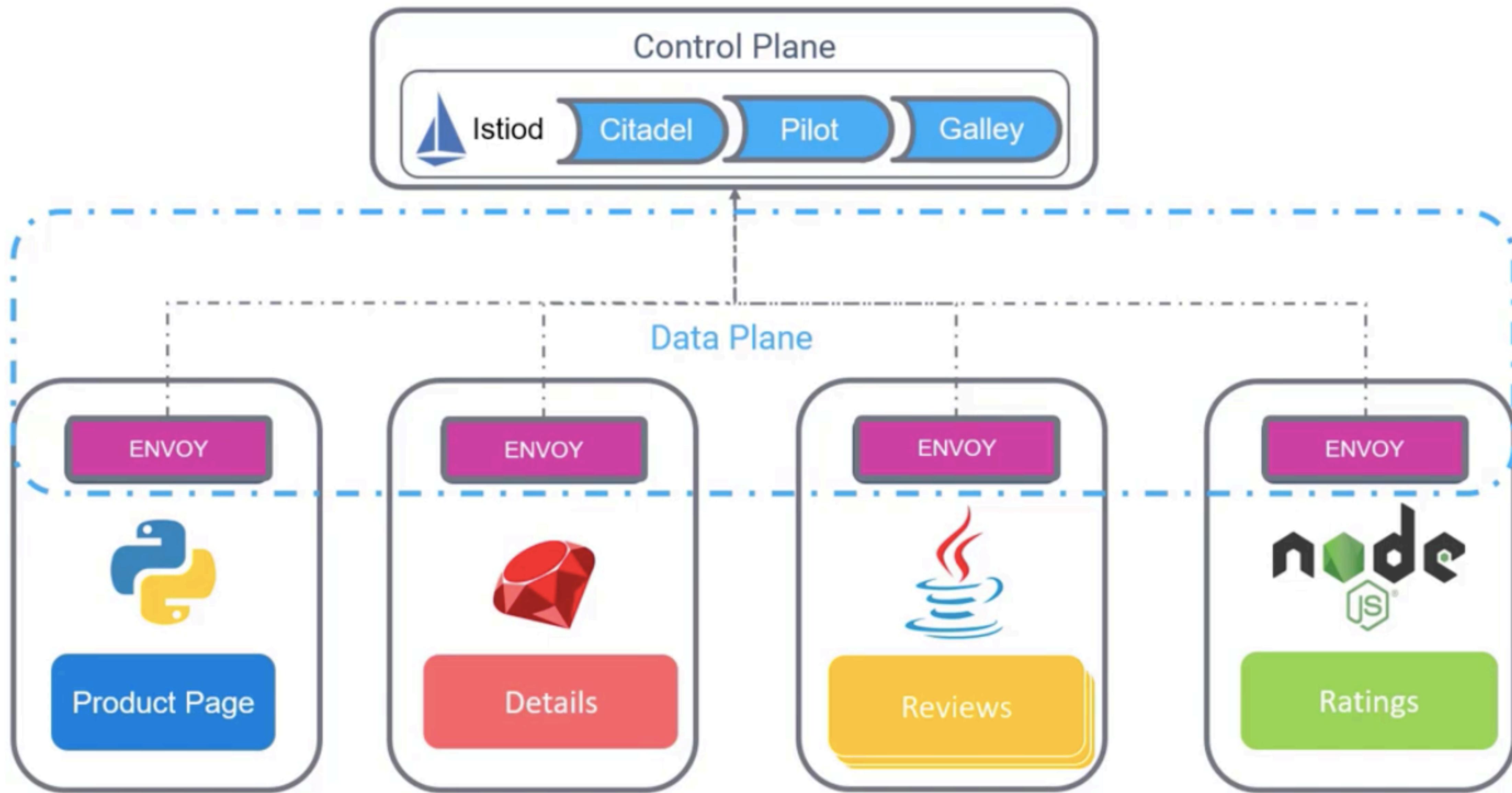
What is Service Mesh Responsible For?

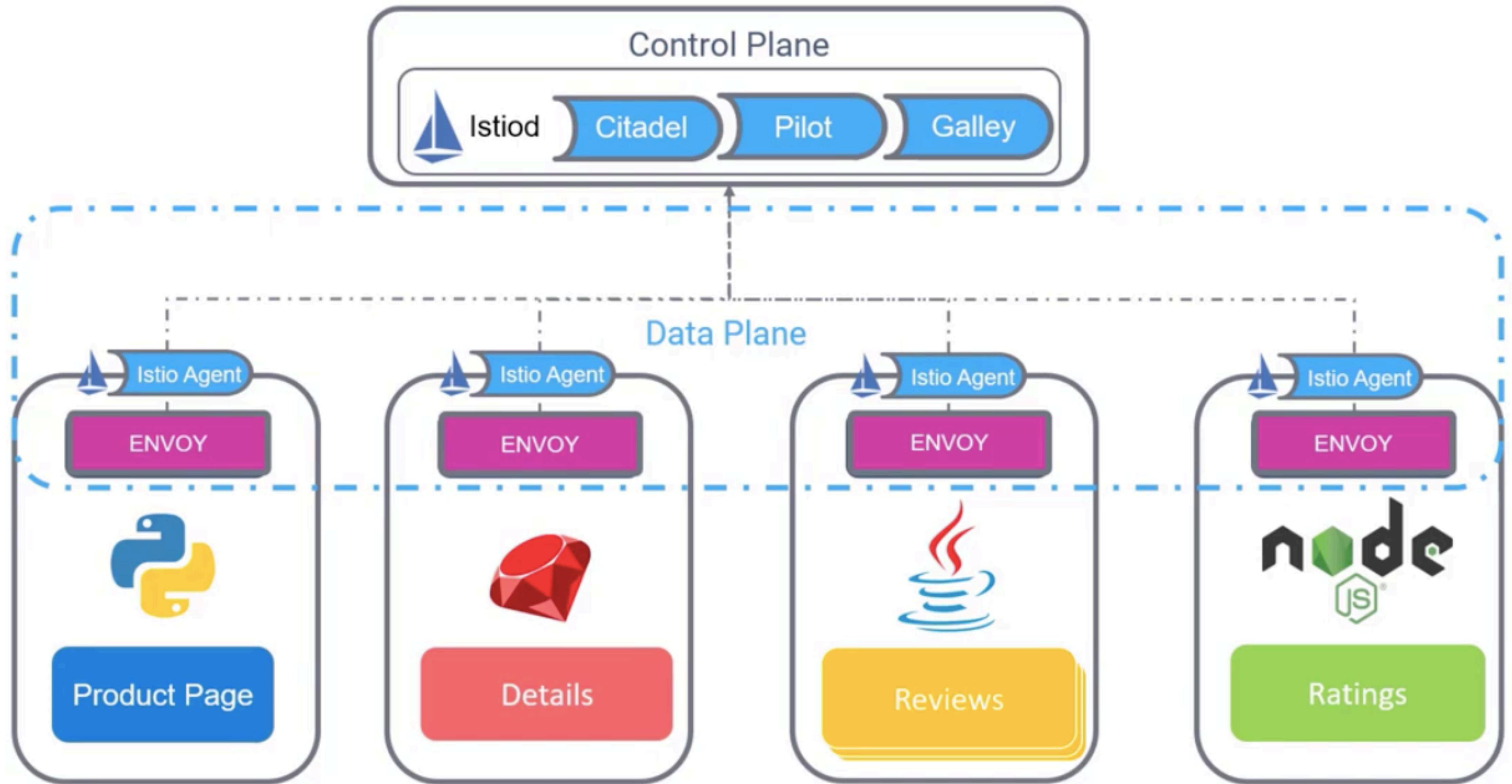




Istio is a service mesh that makes it easy to connect, secure, and observe microservices in distributed systems. It provides a simple way to manage traffic between services, and it can be used to implement advanced features like canary releases, circuit breakers, and policy enforcement. Istio is built on top of an open-source framework called Envoy, which is a high-performance proxy that can handle both TCP and HTTP traffic. Istio is designed to be easy to install and manage, and it can be used with a variety of different cloud providers and container platforms. Istio is a great way to simplify the management of distributed systems, and it can help you build more reliable and efficient applications.









```
>_  
$ istioctl install --set profile=demo -y  
Detected that your cluster does not support third party JWT authentication. Falling  
back to less secure first party JWT. See https://istio.io/v1.9/docs/ops/best-practices/security/#configure-third-party-service-account-tokens for details.  
  Istio core installed  
    ✓ Istiod installed  
    ✓ Ingress gateways installed  
    ✓ Egress gateways installed  
    ✓ Installation complete
```

istio-ingressgateway

Istiod

istio-egressgateway



istio-system

```
>_ $ istioctl verify-install
1 Istio control planes detected, checking --revision "default" only
✓ Deployment: istio-ingressgateway.istio-system checked successfully
✓ PodDisruptionBudget: istio-ingressgateway.istio-system checked successfully
✓ Role: istio-ingressgateway-sds.istio-system checked successfully
✓ RoleBinding: istio-ingressgateway-sds.istio-system checked successfully
✓ Service: istio-ingressgateway.istio-system checked successfully
✓ ServiceAccount: istio-ingressgateway-service-account.istio-system checked successfully
✓ Deployment: istio-egressgateway.istio-system checked successfully
✓ PodDisruptionBudget: istio-egressgateway.istio-system checked successfully
✓ Role: istio-egressgateway-sds.istio-system checked successfully
✓ RoleBinding: istio-egressgateway-sds.istio-system checked successfully
✓ Service: istio-egressgateway.istio-system checked successfully
✓ ServiceAccount: istio-egressgateway-service-account.istio-system checked successfully
✓ ClusterRole: istiod-istio-system.istio-system checked successfully

✓ EnvoyFilter: tcp-stats-filter-1.9.istio-system checked successfully
Checked 12 custom resource definitions
Checked 3 Istio Deployments
✓ Istio is installed and verified successfully
```

> _

```
$ kubectl apply -f samples/bookinfo/platform/kube/bookinfo.yaml
deployment.apps/details-v1 created
deployment.apps/ratings-v1 created
deployment.apps/reviews-v1 created
deployment.apps/reviews-v2 created
deployment.apps/reviews-v3 created
deployment.apps/productpage-v1 created
...
```

Product Page

Details

Reviews v1

Reviews v2

Ratings

Reviews v3

```
>_
$ kubectl get pods -A
NAMESPACE     NAME           READY   STATUS    RESTARTS   AGE
default       details-v1-66b6955995-zgrd8   1/1     Running   0          6m57s
default       productpage-v1-5d9b4c9849-dckrt   1/1     Running   0          6m57s
default       ratings-v1-fd78f799f-s94cc    1/1     Running   0          6m58s
default       reviews-v1-6549ddccc5-bxv4n   1/1     Running   0          6m58s
default       reviews-v2-76c4865449-2qmhj   1/1     Running   0          6m58s
default       reviews-v3-6b554c875-vbf8v    1/1     Running   0          6m58s
```

Product Page

Details

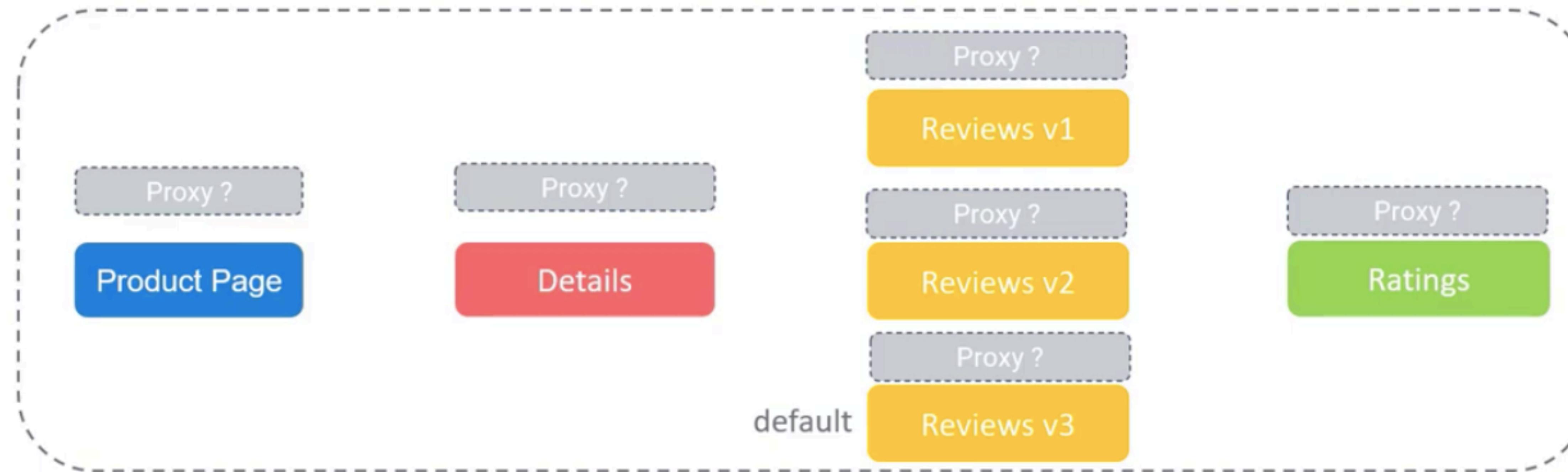
Reviews v1

Reviews v2

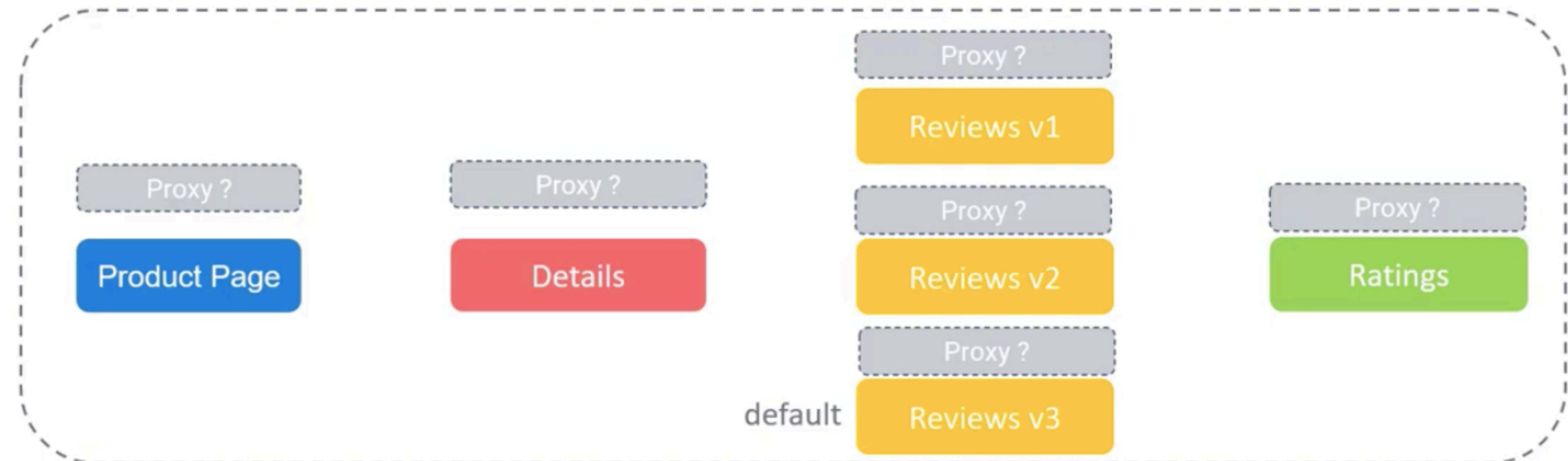
Ratings

Reviews v3

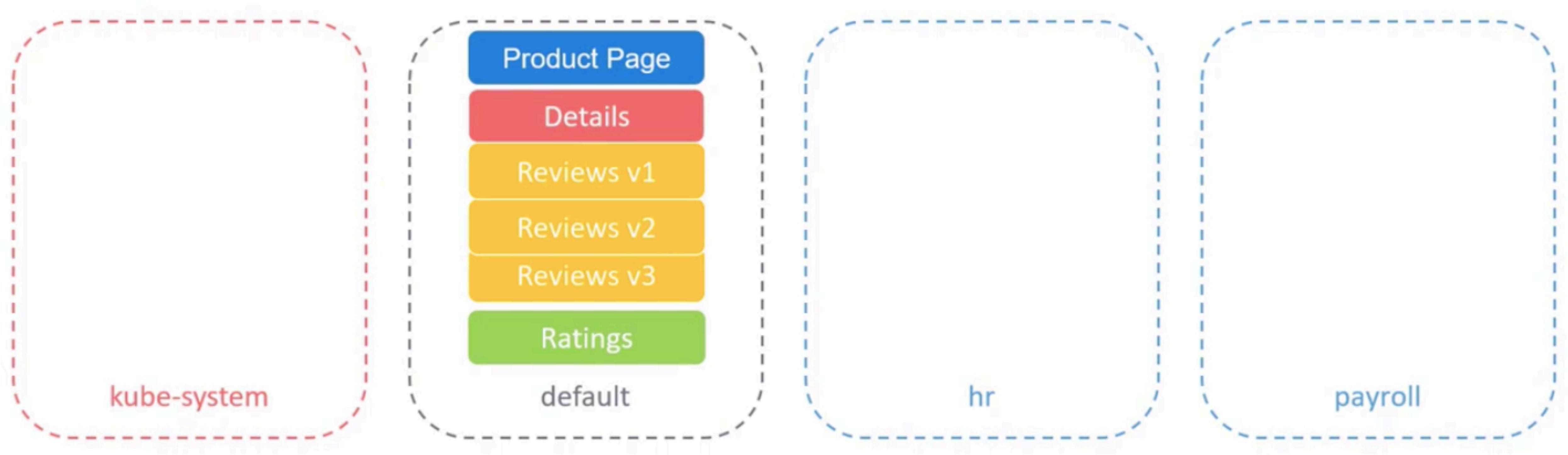
```
>_
$ kubectl get pods -A
NAMESPACE      NAME
default        details-v1-66b6955995-zgrd8
default        productpage-v1-5d9b4c9849-dckrt
default        ratings-v1-fd78f799f-s94cc
default        reviews-v1-6549ddccc5-bxv4n
default        reviews-v2-76c4865449-2qmhj
default        reviews-v3-6b554c875-vbf8v
          READY  STATUS  RESTARTS  AGE
1/1   Running  0          6m57s
1/1   Running  0          6m57s
1/1   Running  0          6m58s
1/1   Running  0          6m58s
1/1   Running  0          6m58s
1/1   Running  0          6m58s
```



```
>_  
$ istioctl analyze  
Info [IST0102] (Namespace default) The namespace is not enabled for Istio injection.  
Run 'kubectl label namespace default istio-injection=enabled' to enable it, or  
'kubectl label namespace default istio-injection=disabled' to explicitly mark it as  
not needing injection.
```

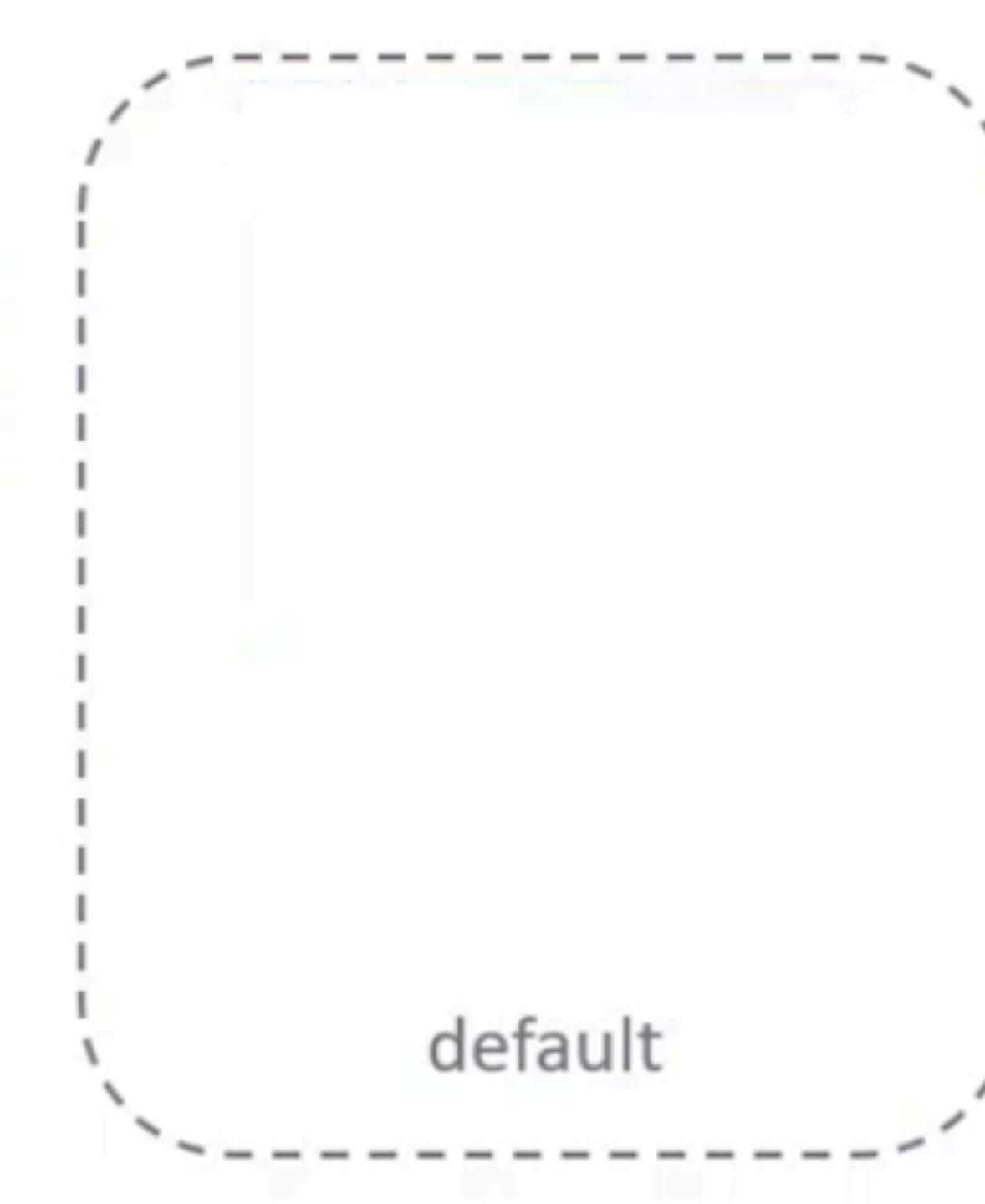


```
>_ $ istioctl analyze  
Info [IST0102] (Namespace default) The namespace is not enabled for Istio injection.  
Run 'kubectl label namespace default istio-injection=enabled' to enable it, or  
'kubectl label namespace default istio-injection=disabled' to explicitly mark it as  
not needing injection.
```



>_

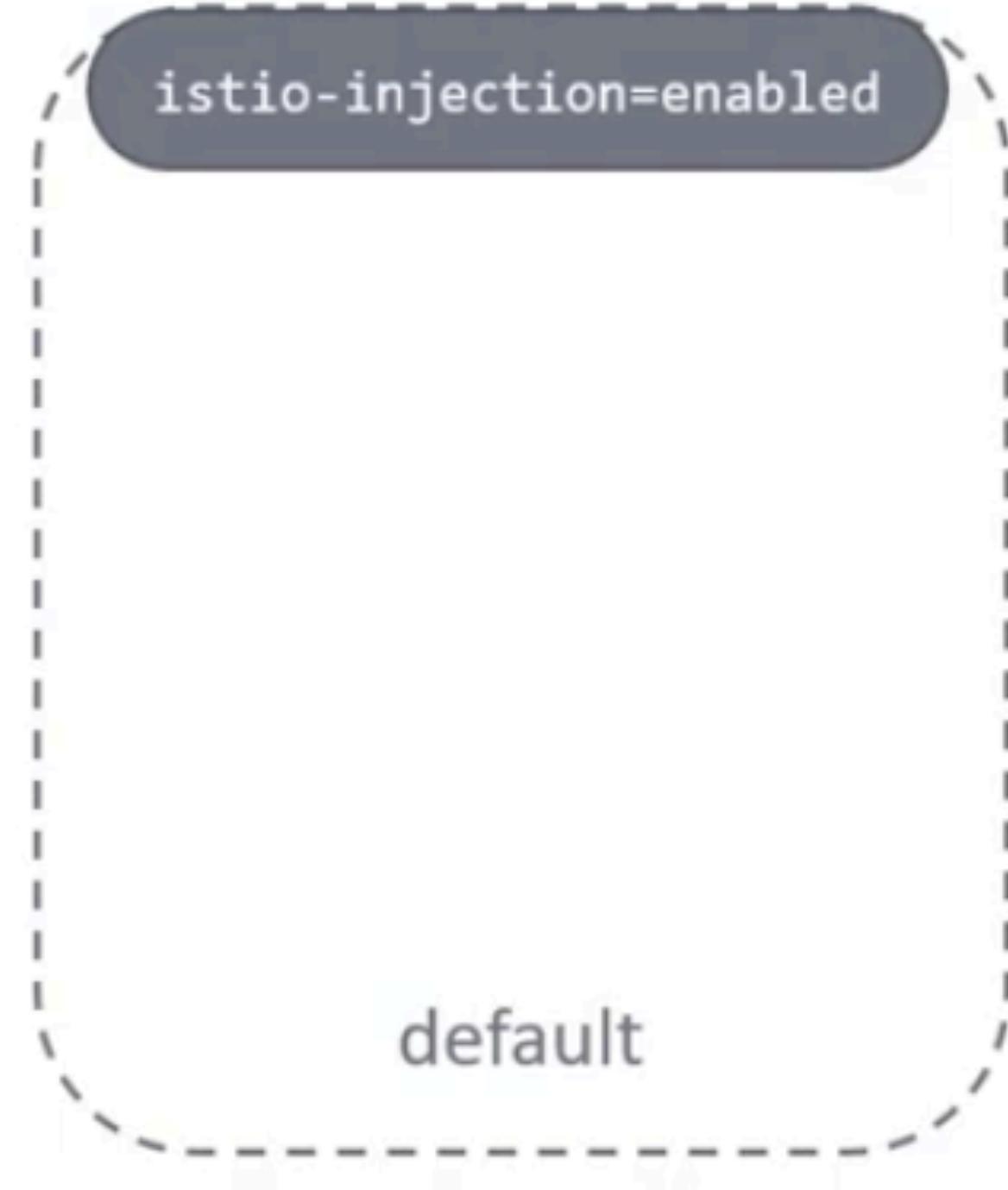
```
$ kubectl delete -f samples/bookinfo/platform/kube/bookinfo.yaml
service "details" deleted
serviceaccount "bookinfo-details" deleted
service "ratings" deleted
serviceaccount "bookinfo-ratings" deleted
serviceaccount "bookinfo-reviews" deleted
service "productpage" deleted
serviceaccount "bookinfo-productpage" deleted
```



```
>_
```

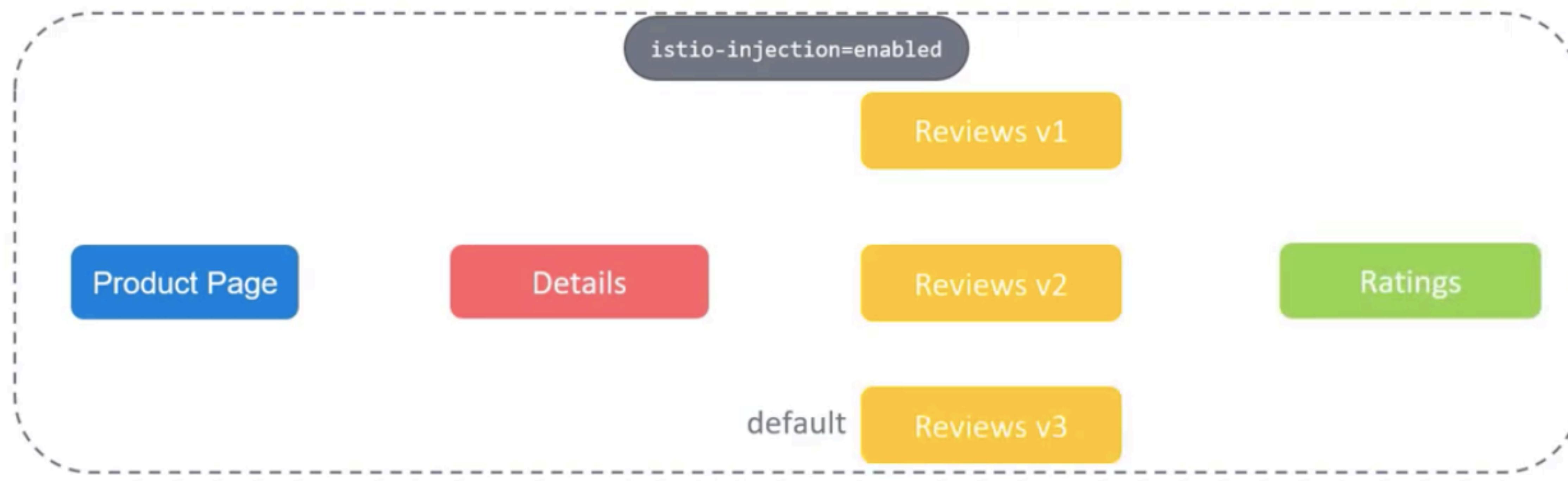
```
$ kubectl label namespace default istio-injection=enabled
```

```
namespace/default labeled
```



>_

```
$ kubectl apply -f samples/bookinfo/platform/kube/bookinfo.yaml
deployment.apps/details-v1 created
deployment.apps/ratings-v1 created
deployment.apps/reviews-v1 created
deployment.apps/reviews-v2 created
deployment.apps/reviews-v3 created
service/productpage created
deployment.apps/productpage-v1 created
...
```



>_

\$ istioctl analyze

✓ No validation issues found when analyzing namespace: default.

Product Page

Details

Reviews v2

Ratings

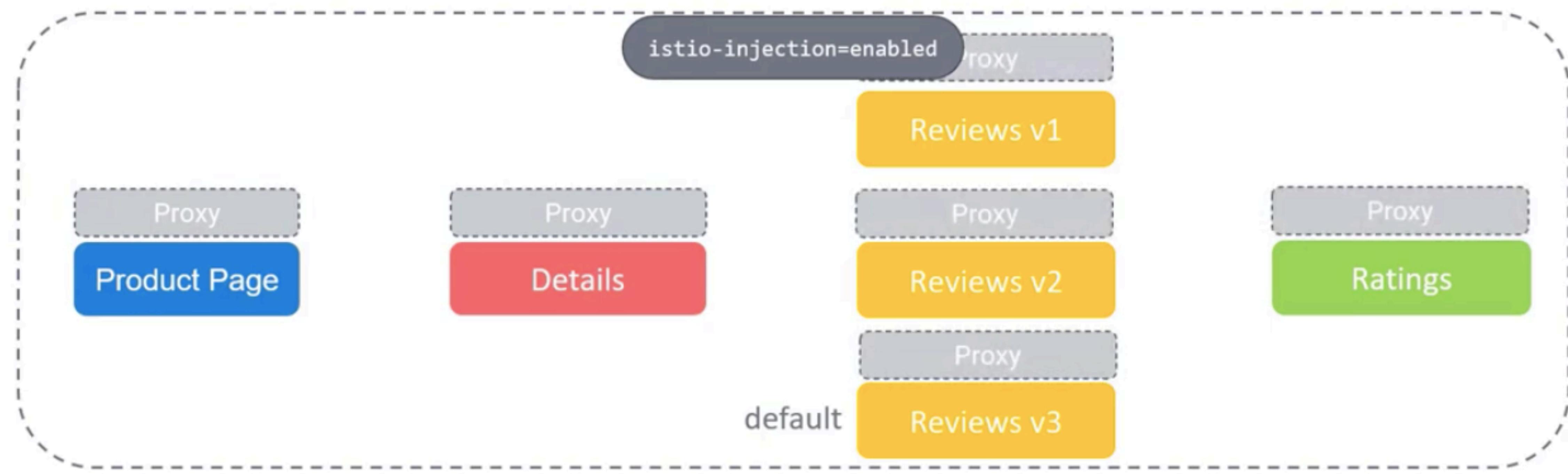
default

Reviews v3

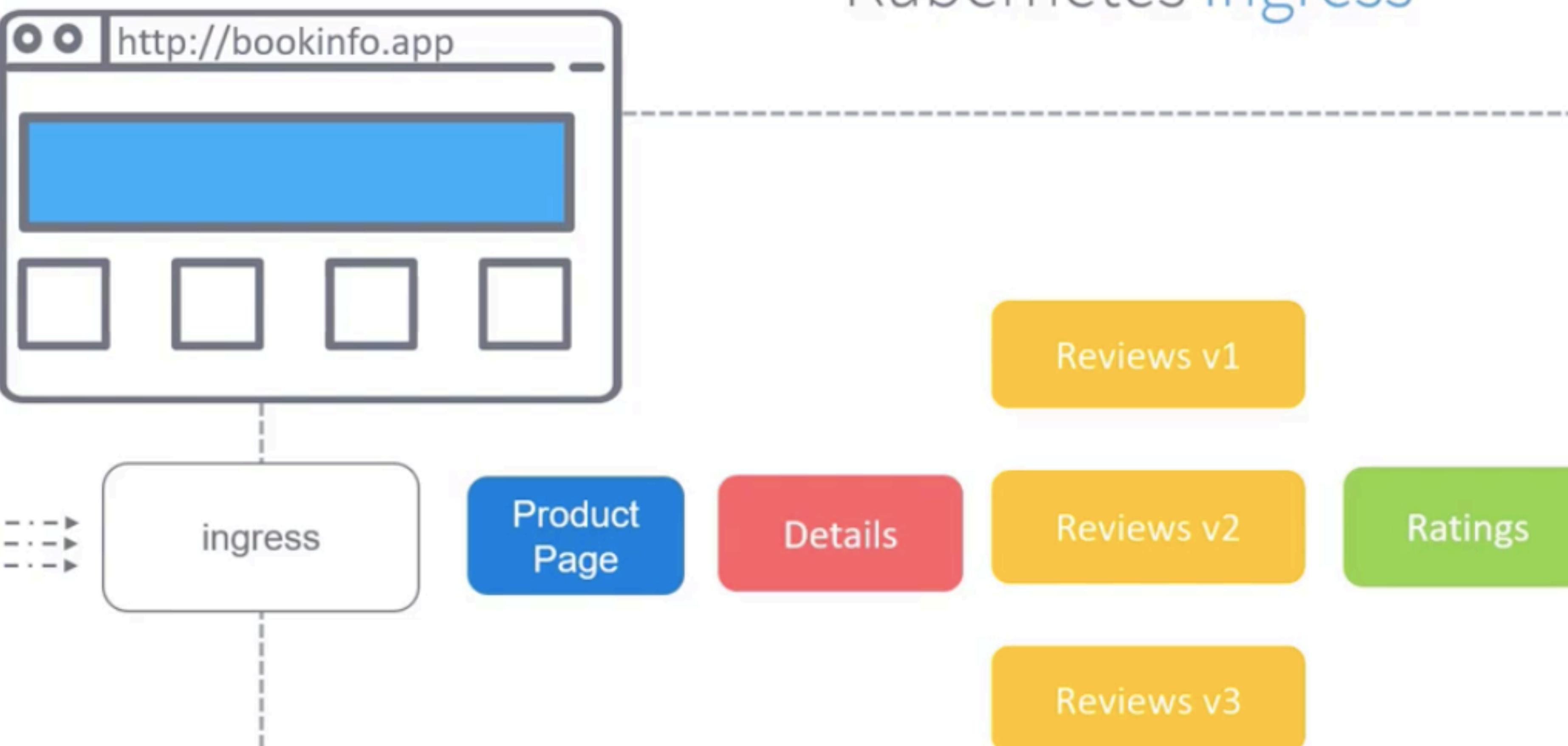
istio-injection=enabled

Reviews v1

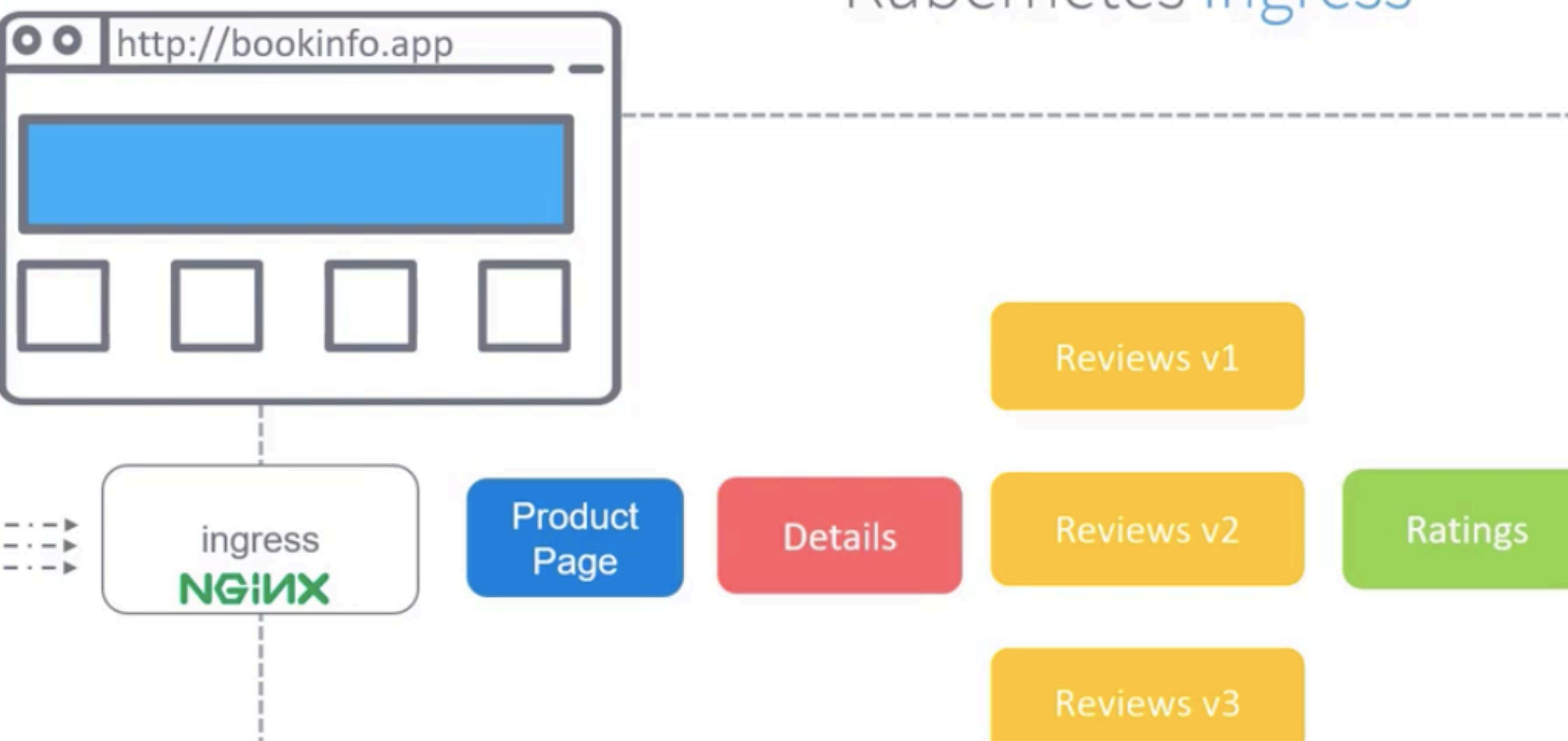
```
>_
$ kubectl get pods
NAME                               READY   STATUS    RESTARTS   AGE
details-v1-5f449bdbb9-vrgzh        2/2     Running   0          26s
productpage-v1-6f9df695b7-cx259   2/2     Running   0          26s
ratings-v1-857bb87c57-hmpfd       2/2     Running   0          26s
reviews-v1-68f9c47f69-cbj7c       2/2     Running   0          26s
reviews-v2-5d56c488f5-wb4v7       2/2     Running   0          26s
reviews-v3-869ff44845-h5fpf       2/2     Running   0          26s
```



Kubernetes Ingress



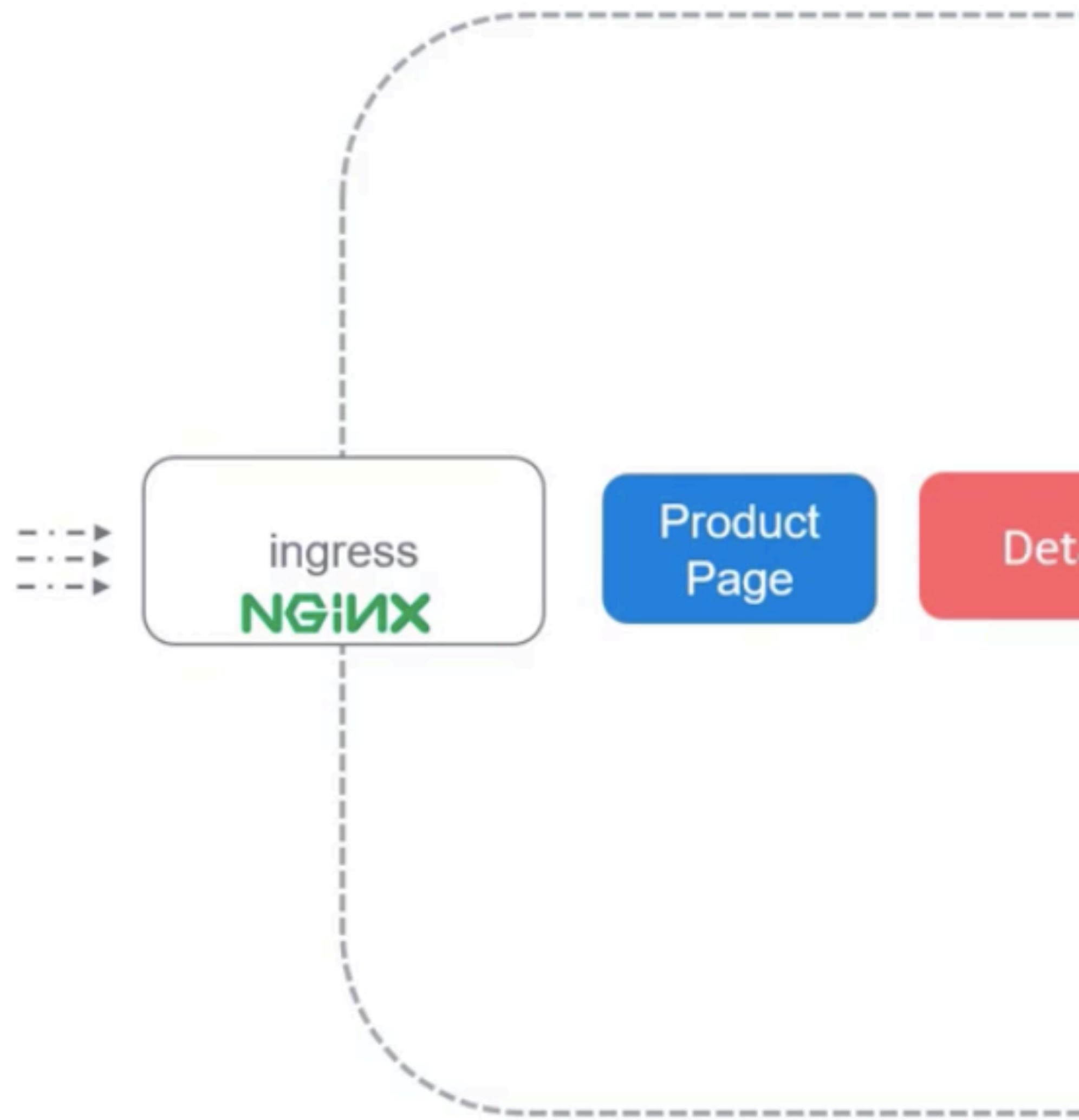
Kubernetes Ingress



Kubernetes Ingress

bookinfo-ingress.yaml

```
apiVersion: networking.k8s.io/v1beta1
kind: Ingress
metadata:
  name: ingress
spec:
  rules:
  - host: bookinfo.app
    http:
      paths:
      - path: /
        backend:
          serviceName: productpage
          servicePort: 8000
```



Istio Gateway



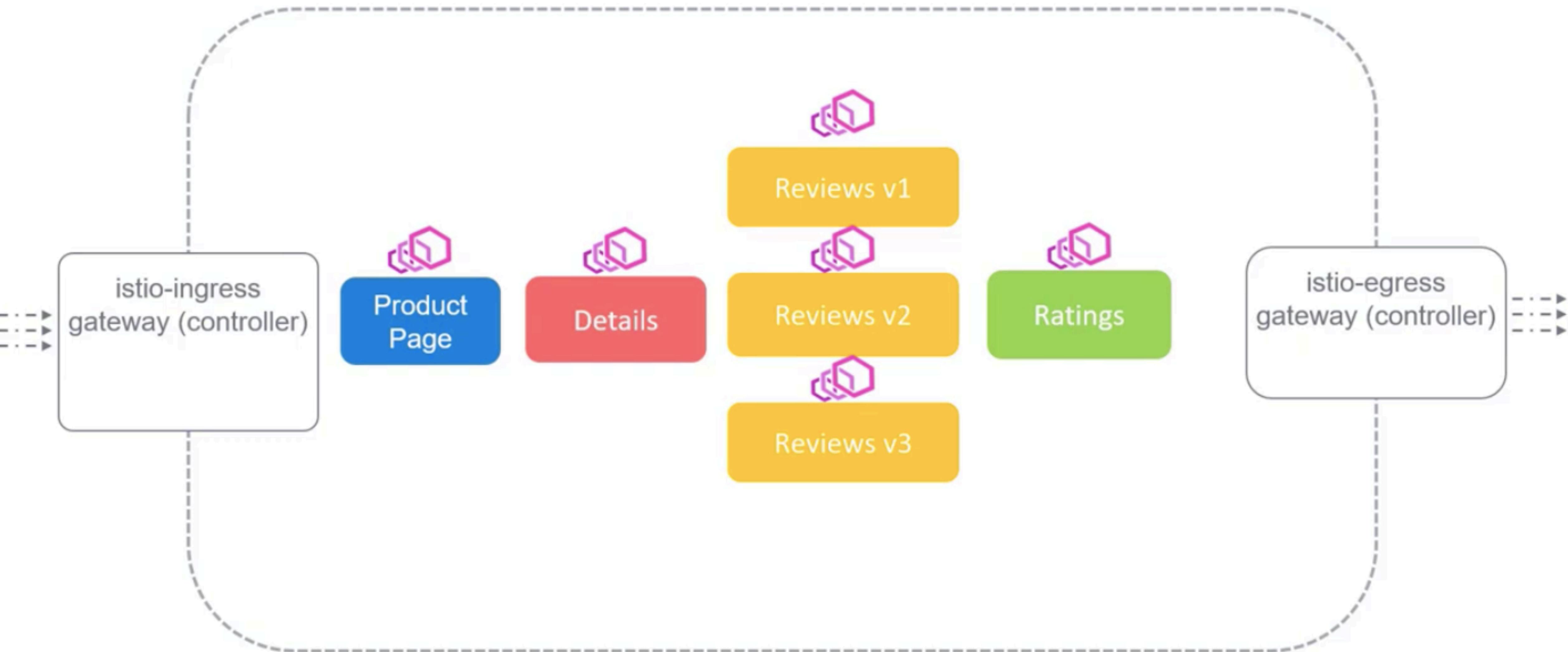
Istio Gateway



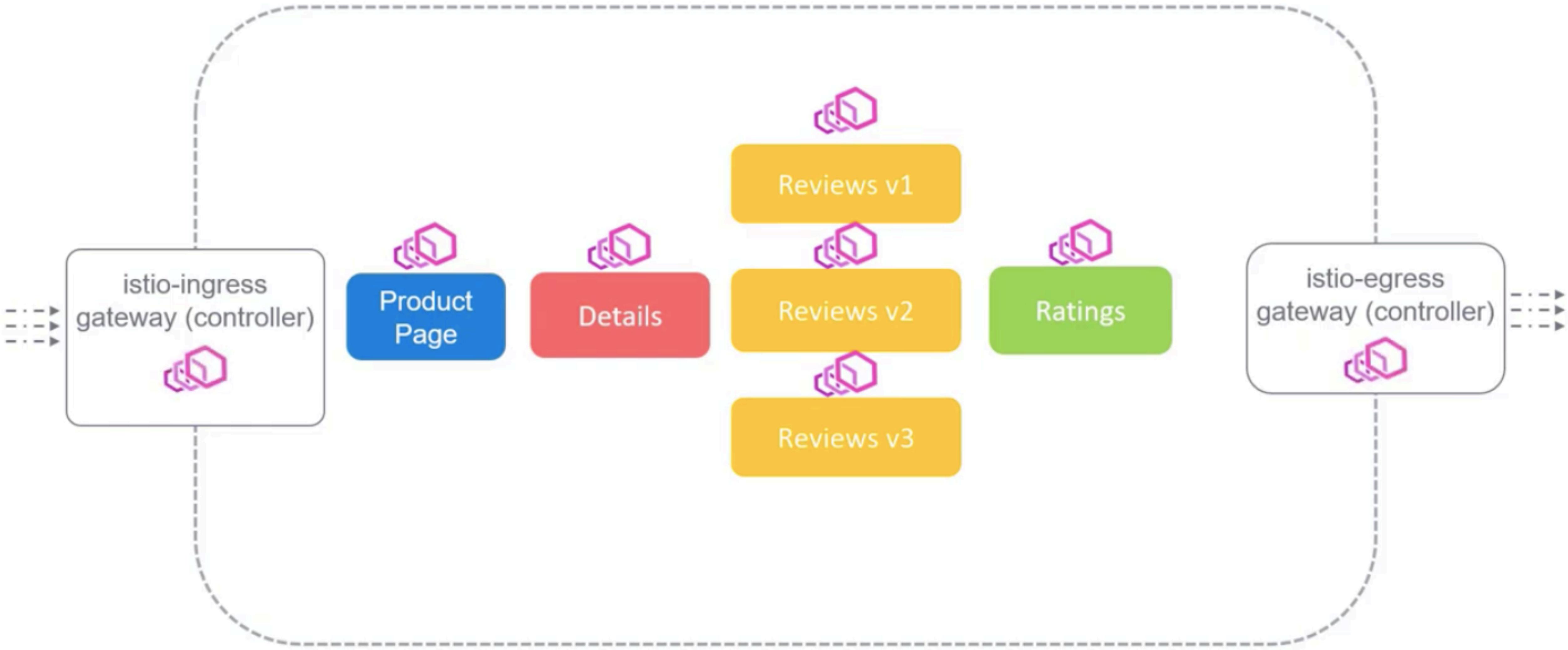
Istio Gateway



Istio Gateway



Istio Gateway



Istio Gateway

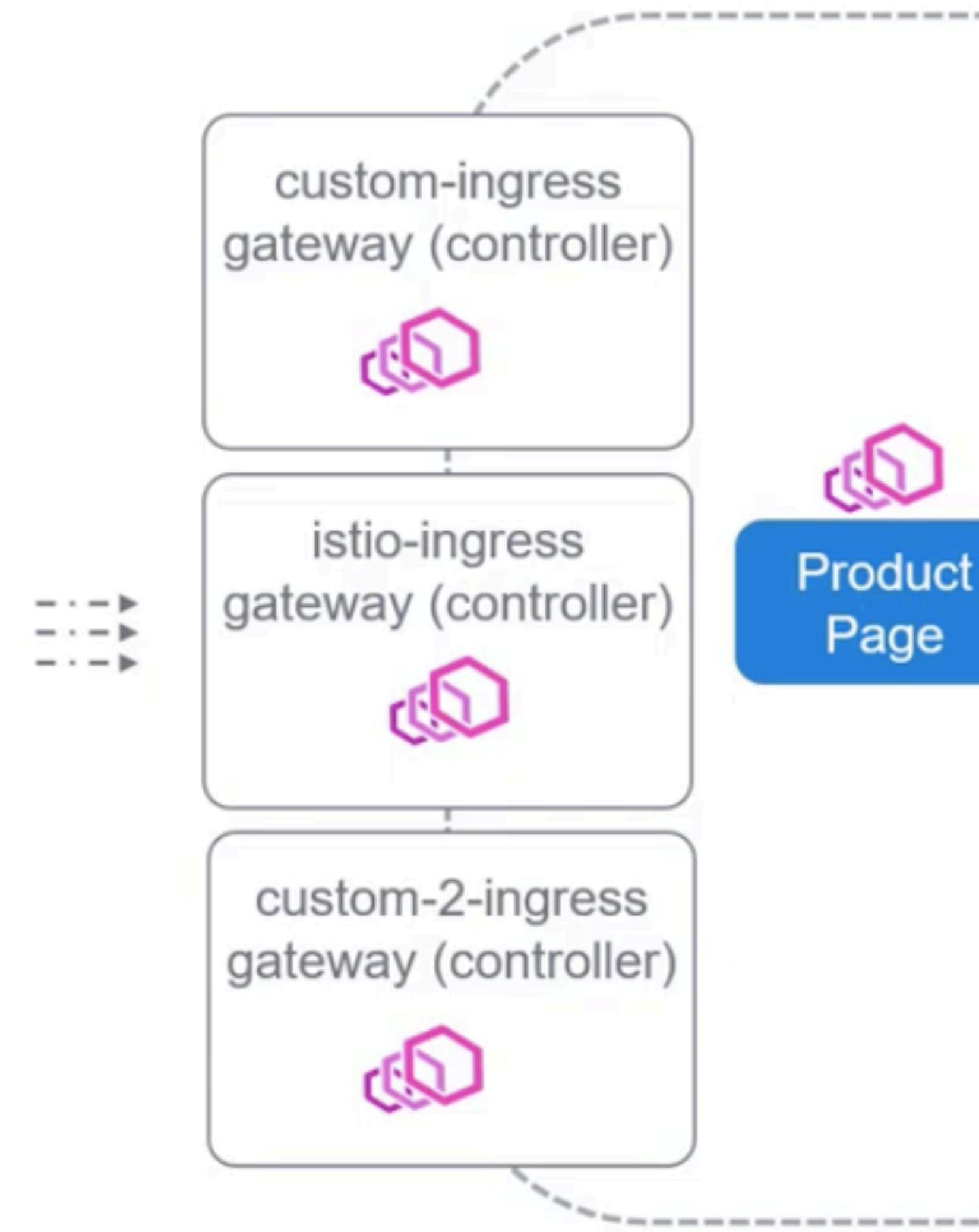


Istio Gateway

bookinfo-gateway.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: Gateway
metadata:
  name: bookinfo-gateway
spec:
  servers:
  - port:
      number: 80
      name: http
      protocol: HTTP
    hosts:
    - "bookinfo.app"
```

bookinfo-gateway



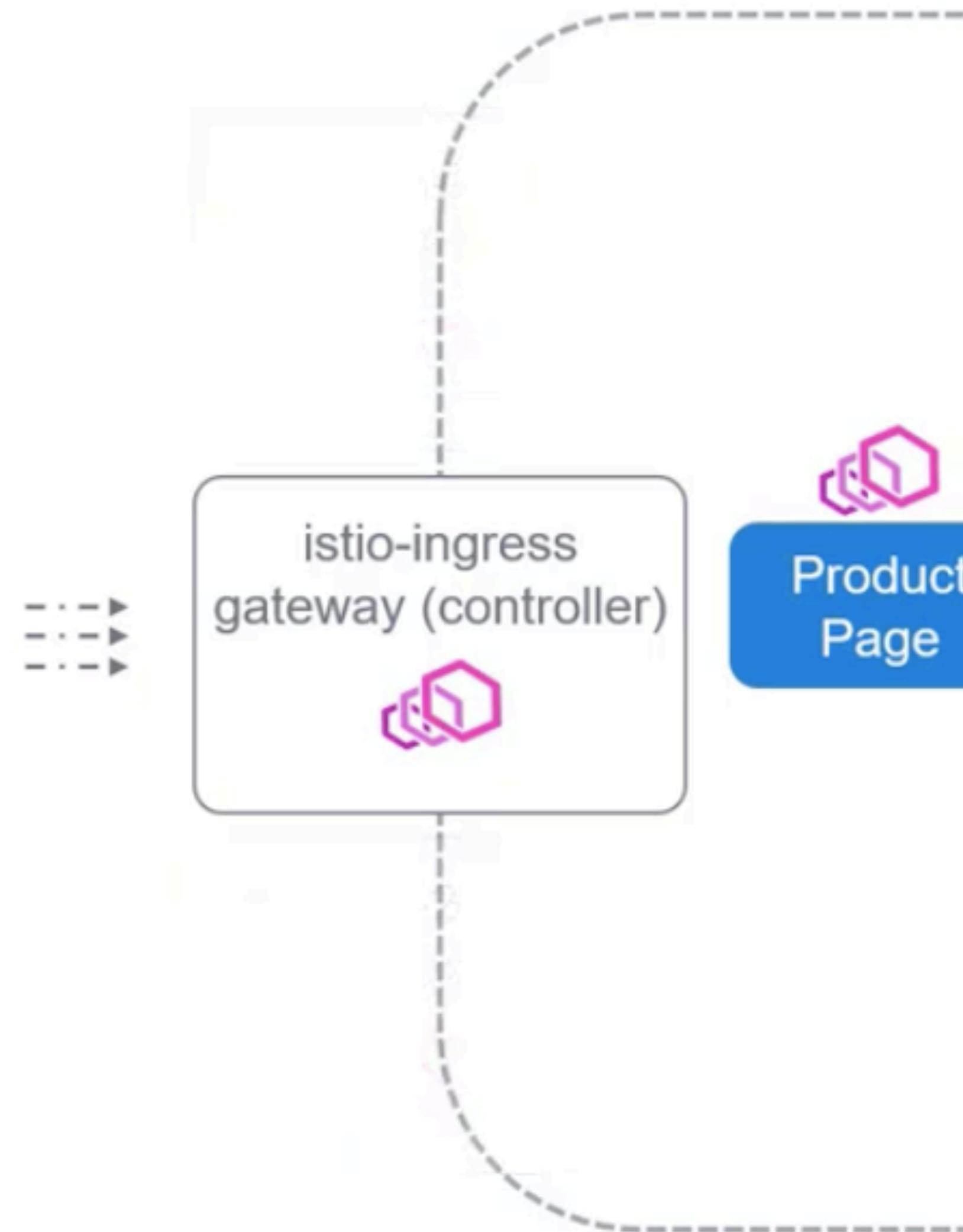
>_

Istio Gateway

bookinfo-gateway.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: Gateway
metadata:
  name: bookinfo-gateway
spec:
  selector:
    istio: ingressgateway
  servers:
  - port:
      number: 80
      name: http
      protocol: HTTP
    hosts:
    - "bookinfo.app"
```

bookinfo-gateway



Istio Gateway

```
bookinfo-gateway.yaml
```

```
apiVersion: networking.istio.io/v1alpha3
kind: Gateway
metadata:
  name: bookinfo-gateway
spec:
  selector:
    istio: ingressgateway
  servers:
  - port:
      number: 80
      name: http
      protocol: HTTP
    hosts:
    - "bookinfo.app"
```

```
>_
```

```
$ kubectl apply -f bookinfo-gateway.yaml
```

```
gateway.networking.istio.io/bookinfo-gateway created
```

```
>_
```

```
$ kubectl get gateway
```

| NAME | AGE |
|------------------|-----|
| bookinfo-gateway | 9d |

```
$ kubectl describe gateway bookinfo-gateway
```

| | |
|--------------|--|
| Name: | bookinfo-gateway |
| Namespace: | default |
| Labels: | <none> |
| Annotations: | API Version: networking.istio.io/v1beta1 |
| Kind: | Gateway |
| ... | |
| Spec: | |
| Selector: | Istio: ingressgateway |
| Servers: | |
| Hosts: | * |
| Port: | |
| Name: | http |
| Number: | 80 |
| Protocol: | HTTP |
| Events: | <none> |

```
~/istio-1.10.3 — open • istioctl dashboard kiali          ~/istio-1.10.3 — -bash          ~/istio-1.10.3 — -bash
training@local istio-1.10.3 $ kubectl apply -f - <<EOF
version: networking.istio.io/v1alpha3
kind: Gateway
metadata:
  name: bookinfo-gateway
spec:
  selector:
    istio: ingressgateway
  servers:
    port:
      number: 80
      name: http
      protocol: HTTP
  hosts:
    - "bookinfo.app"
  EOF
ay.networking.istio.io/bookinfo-gateway created
training@local istio-1.10.3 $ 
```

```
>     name: http
>     protocol: HTTP
>   hosts:
>     - "bookinfo.app"
|> EOF
gateway.networking.istio.io/bookinfo-gateway created
istiotraining@local istio-1.10.3 $ kubectl apply -f - <<EOF
> apiVersion: networking.istio.io/v1alpha3
> kind: VirtualService
> metadata:
>   name: bookinfo
> spec:
>   hosts:
>     - bookinfo.app
>   gateways:
>     - bookinfo-gateway
>   http:
>     - match:
>       - uri:
>         exact: /productpage
>       - uri:
>         prefix: /static
>       - uri:
>         exact: /login
>       - uri:
>         exact: /logout
>       - uri:
>         prefix: /api/v1/products
>   route:
>     - destination:
>       host: productpage
>       port:
>         number: 9080
>
|> EOF
virtualservice.networking.istio.io/bookinfo configured
istiotraining@local istio-1.10.3 $
```

```
~/istio-1.10.3 — open + istioctl dashboard kiali ... ~/istio-1.10.3 — -bash ~/istio-1.10.3 — -bash  
istiotraining@local istio-1.10.3 $ curl -s -HHost:bookinfo.app http://$INGRESS_HOST:$INGRESS_PORT/productpage | grep -o "<title>.*</title>"  
<title>Simple Bookstore App</title>  
istiotraining@local istio-1.10.3 $
```

```
stiotraining@local istio-1.10.3 $ echo -e "$(minikube ip)\tbookinfo.app" | sudo tee -a /etc/hosts
assword:
92.168.64.43  bookinfo.app
stiotraining@local istio-1.10.3 $
```

BookInfo Sample

The Comedy of Errors

Summary: Wikipedia Summary: The Comedy of Errors is one of William Shakespeare's early plays. It is his shortest and one of his most farcical comedies, with a major part of the humour coming from slapstick and mistaken identity, in addition to puns and word play.

Book Details

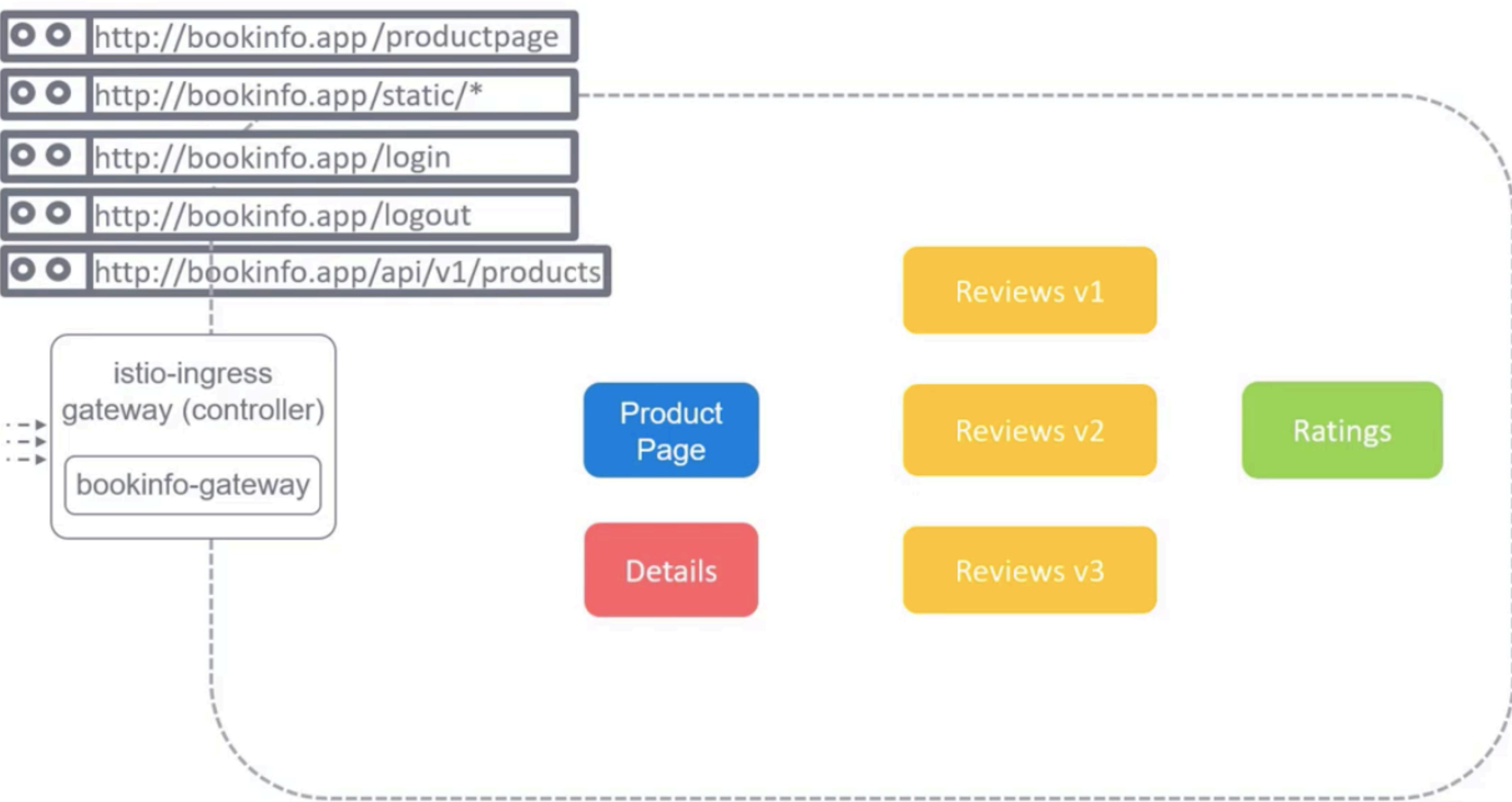
Type: paperback
Pages: 200
Publisher: PublisherA
Language: English
SBN-10: 1234567890
SBN-13: 978-1234567890

Book Reviews

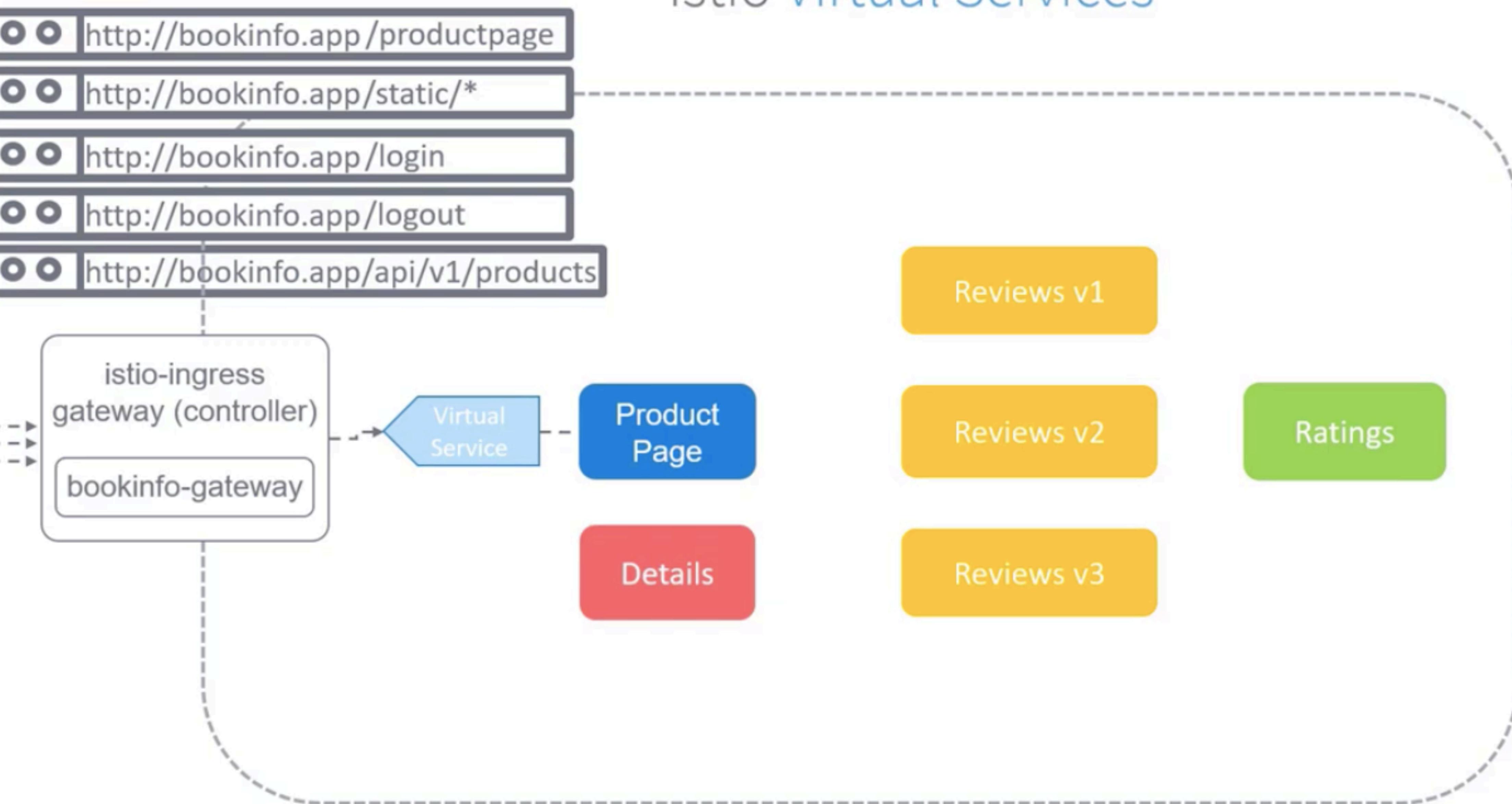
An extremely entertaining play by Shakespeare. The slapstick humour is refreshing!
— Reviewer1
★★★★★

Absolutely fun and entertaining. The play lacks thematic depth when compared to other plays by Shakespeare.
— Reviewer2
★★★★★

Virtual Services



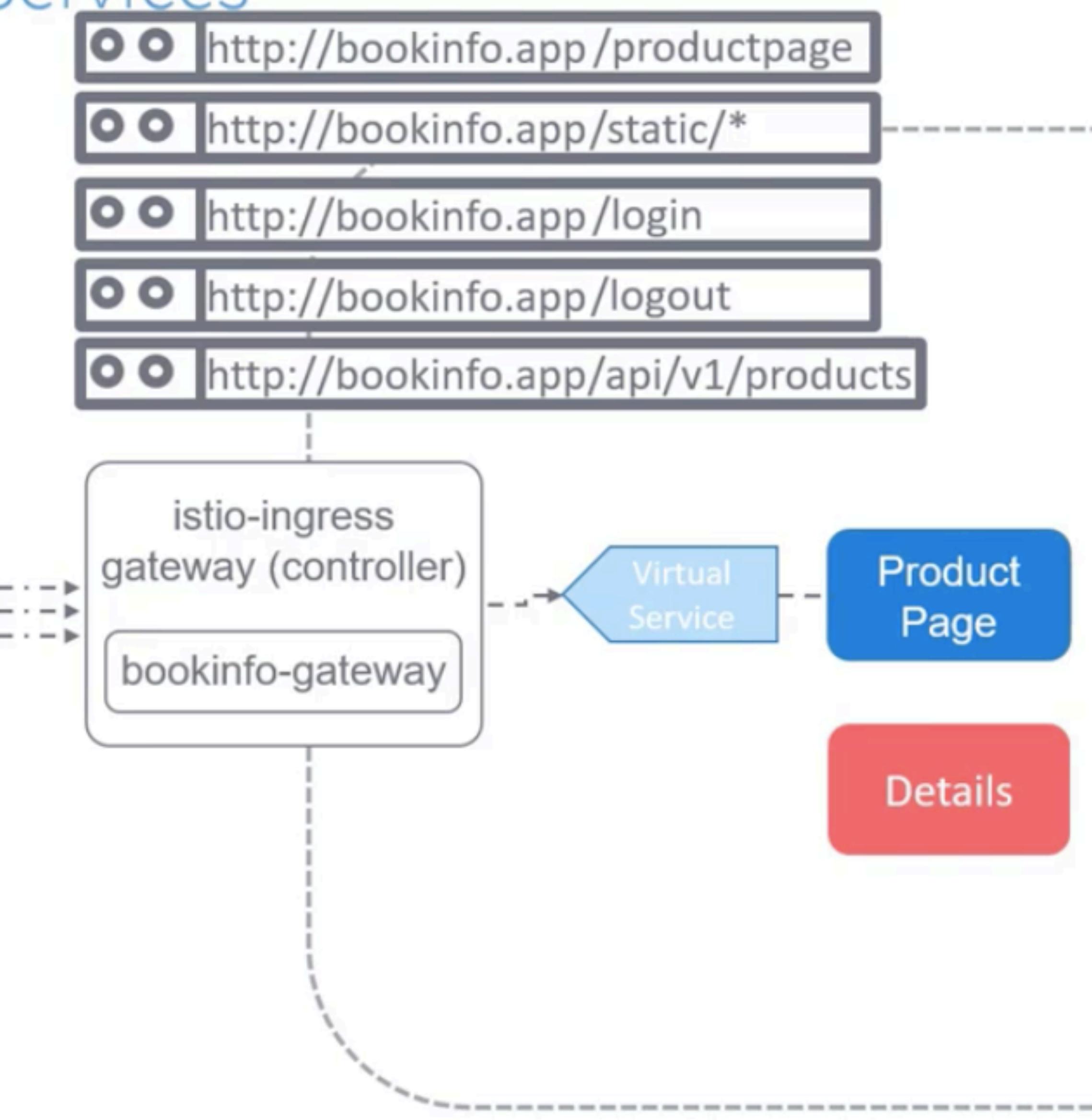
Istio Virtual Services



Istio Virtual Services

virtual-service1.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: bookinfo
spec:
  hosts:
  - "bookinfo.app"
  gateways:
  - bookinfo-gateway
  http:
  - match:
    - uri:
        exact: /productpage
    - uri:
        prefix: /static
    - uri:
        exact: /login
    - uri:
        exact: /logout
    - uri:
        prefix: /api/v1/products
  route:
  - destination:
      host: productpage
      port:
        number: 9080
```



review-v1-deployment.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: reviews-v1
spec:
  replicas: 3
  ...
  template:
    metadata:
      labels:
        app: reviews
        version: v1
```

Product
Page

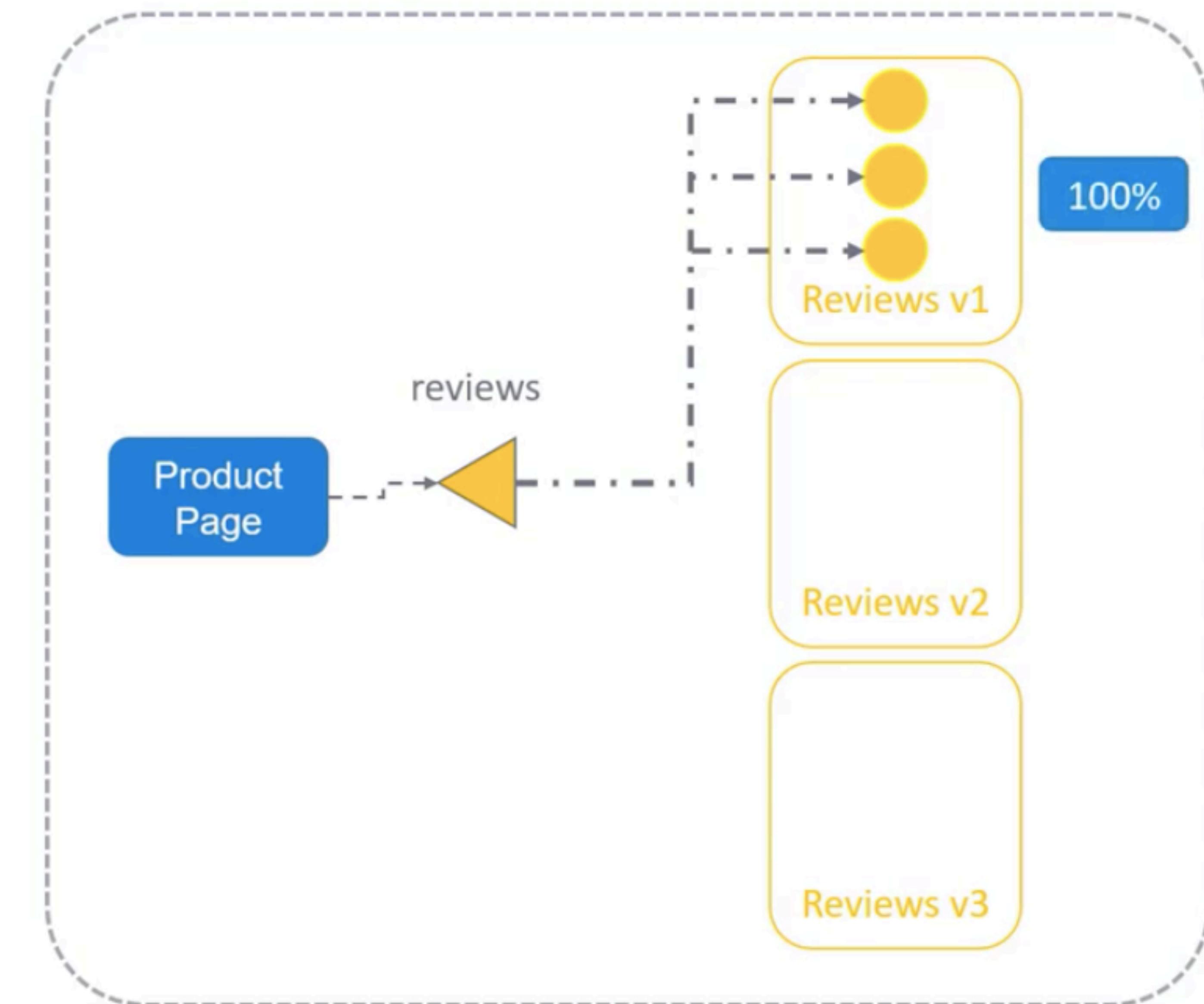


review-v1-deployment.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: reviews-v1
spec:
  replicas: 3
  ...
  template:
    metadata:
      labels:
        app: reviews
        version: v1
```

review-service.yaml

```
apiVersion: v1
kind: Service
metadata:
  name: reviews
spec:
  ports:
    - port: 9080
      name: http
  selector:
    app: reviews
```

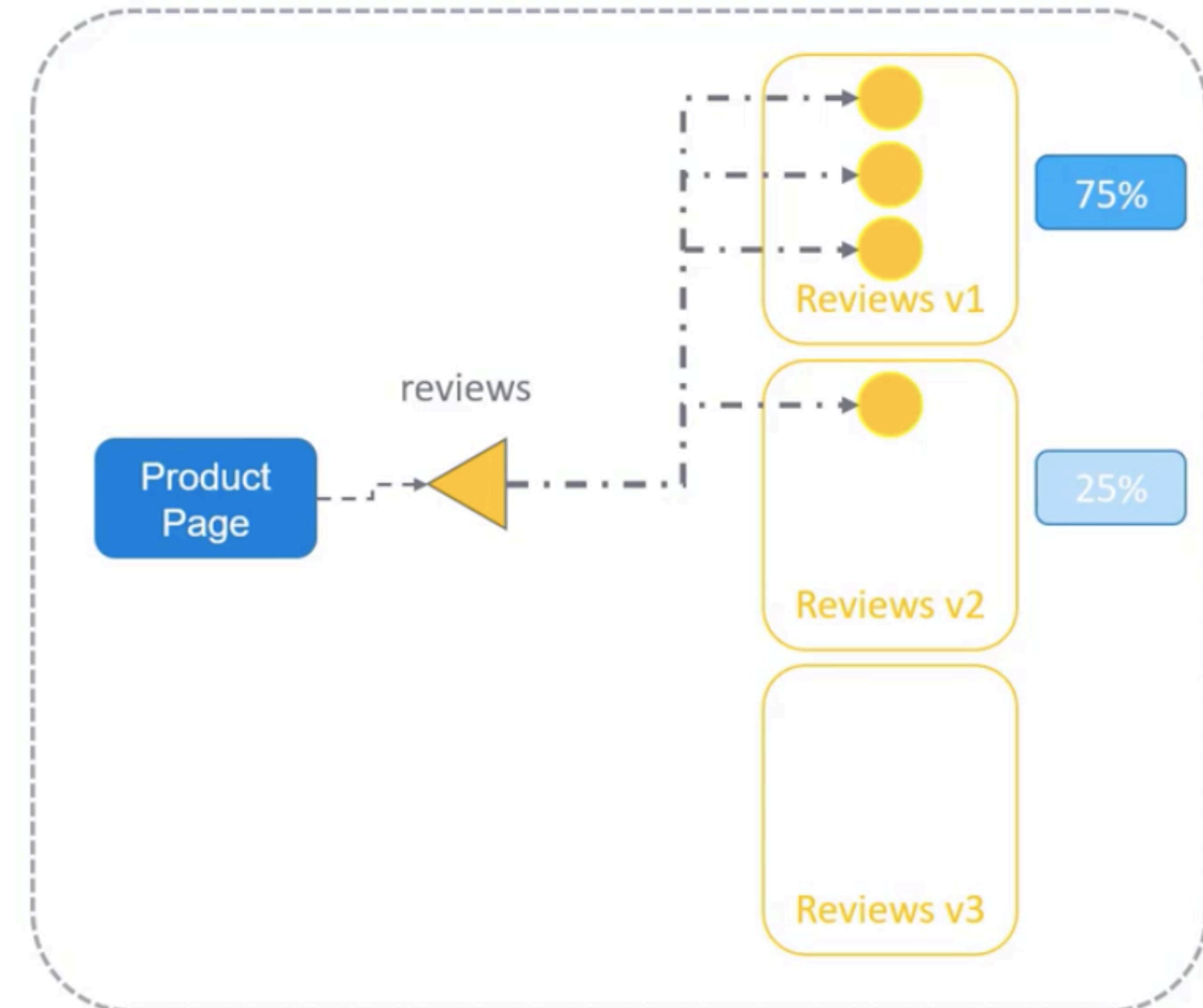


review-v2-deployment.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: reviews-v2
spec:
  replicas: 1
  ...
  template:
    metadata:
      labels:
        app: reviews
        version: v1
```

review-service.yaml

```
apiVersion: v1
kind: Service
metadata:
  name: reviews
spec:
  ports:
  - port: 9080
    name: http
  selector:
    app: reviews
```

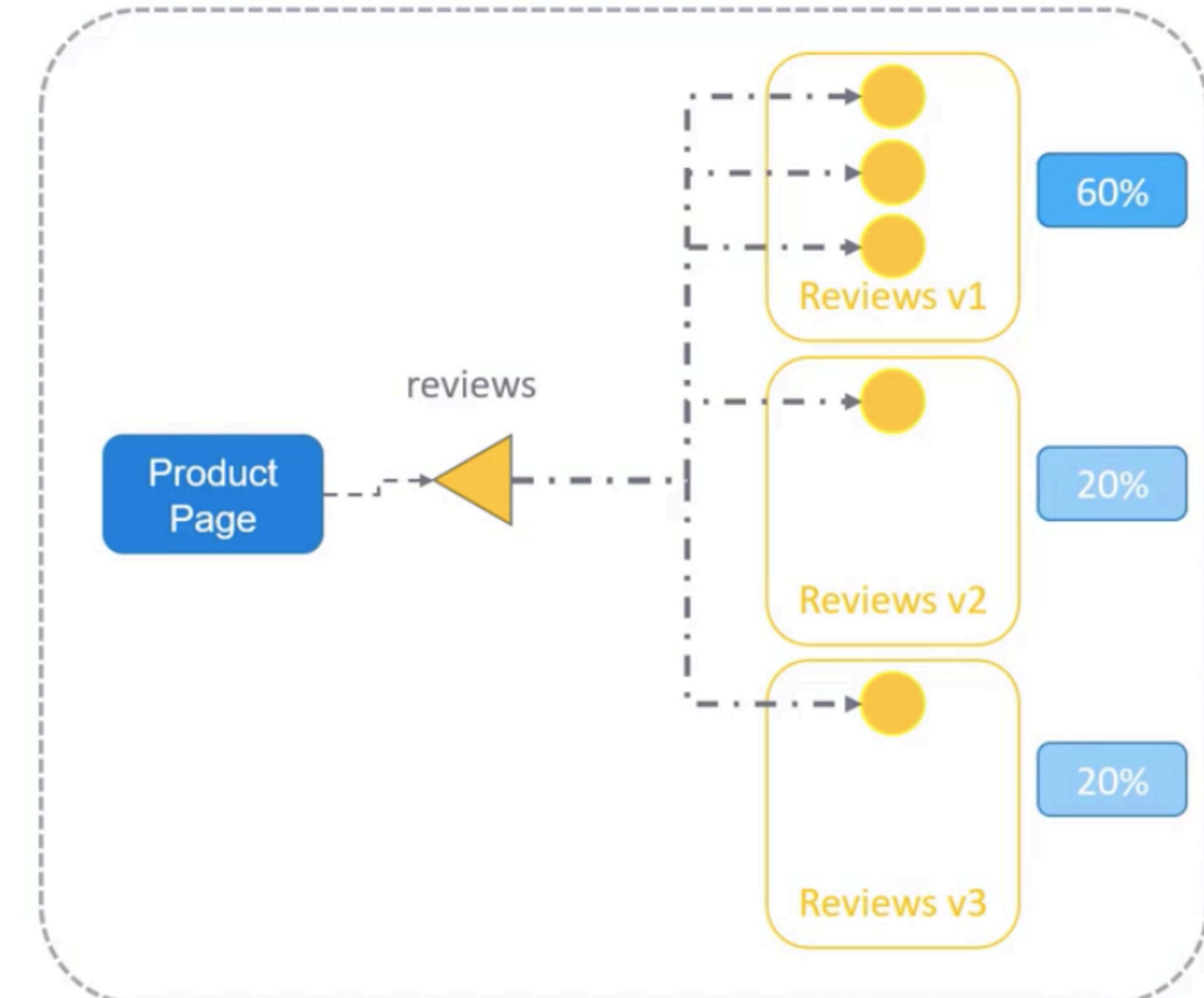


review-v3-deployment.yaml

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: reviews-v3
spec:
  replicas: 1
  ...
  template:
    metadata:
      labels:
        app: reviews
        version: v1
```

review-service.yaml

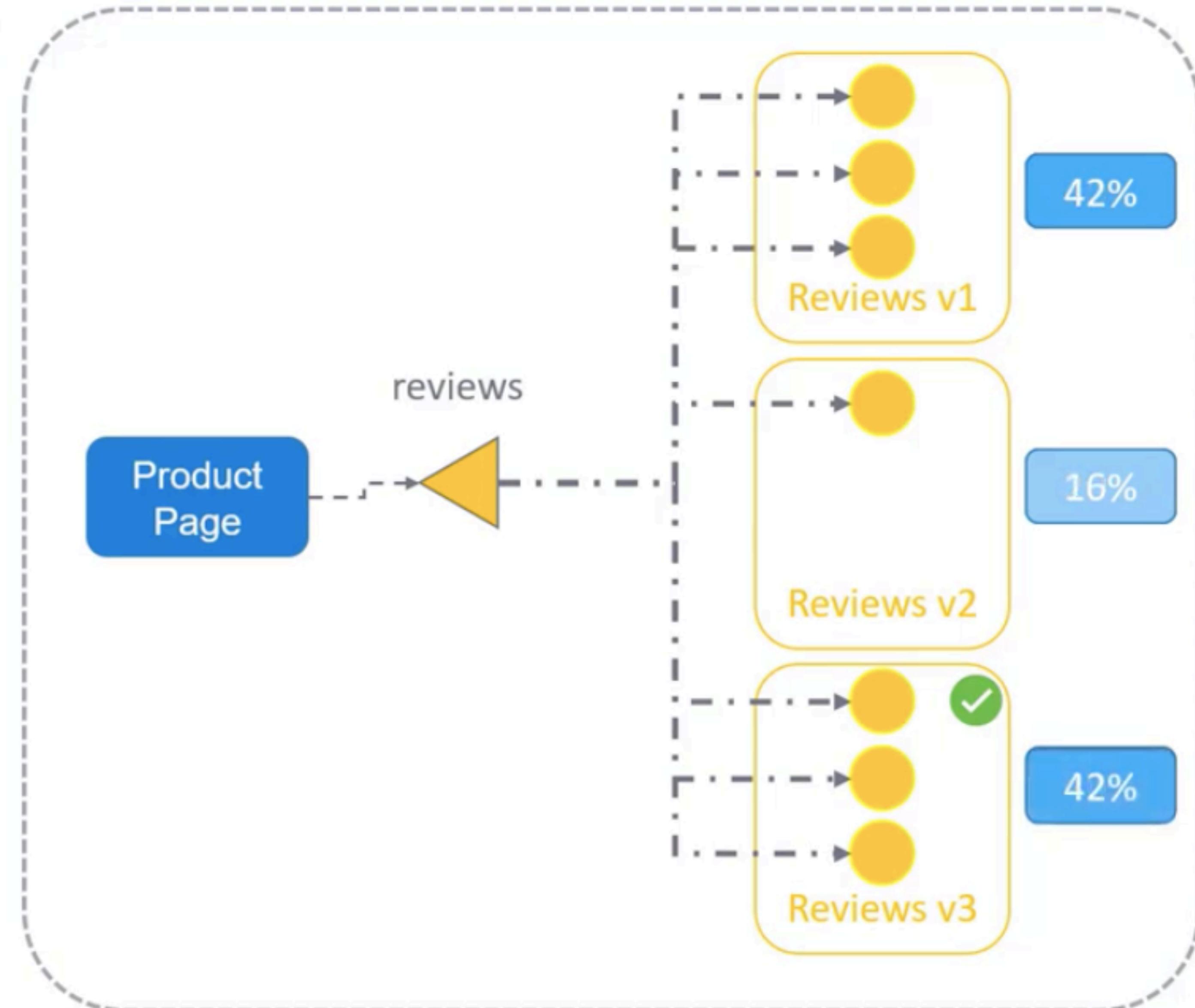
```
apiVersion: v1
kind: Service
metadata:
  name: reviews
spec:
  ports:
  - port: 9080
    name: http
  selector:
    app: reviews
```



```
kubectl scale deployment reviews-v3 --replicas=3  
deployment.apps/reviews-v3 scaled
```

review-service.yaml

```
apiVersion: v1  
kind: Service  
metadata:  
  name: reviews  
spec:  
  ports:  
  - port: 9080  
    name: http  
selector:  
  {app: reviews}
```



>_

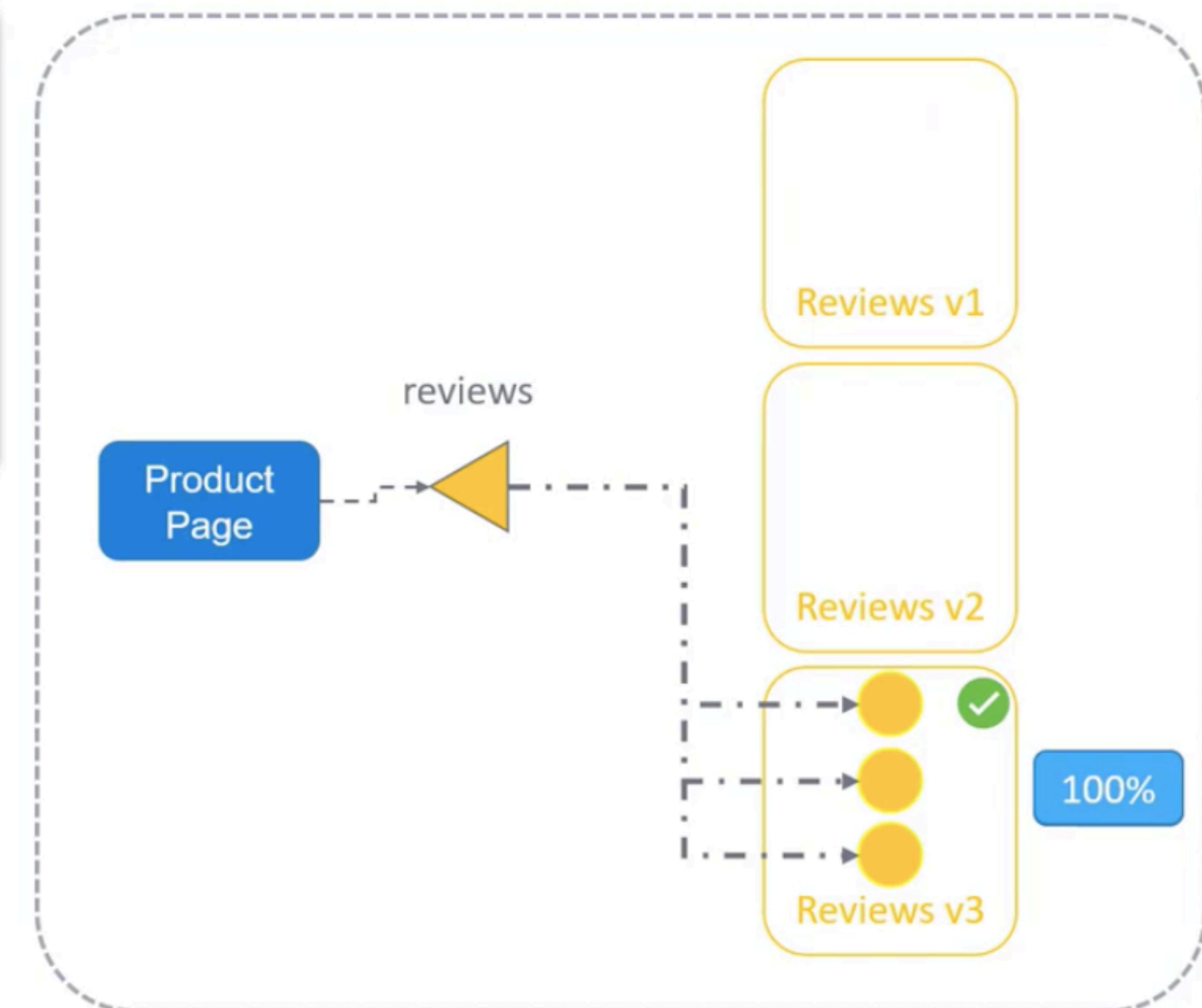
```
$ kubectl scale deployment reviews-v3 --replicas=3
deployment.apps/reviews-v3 scaled

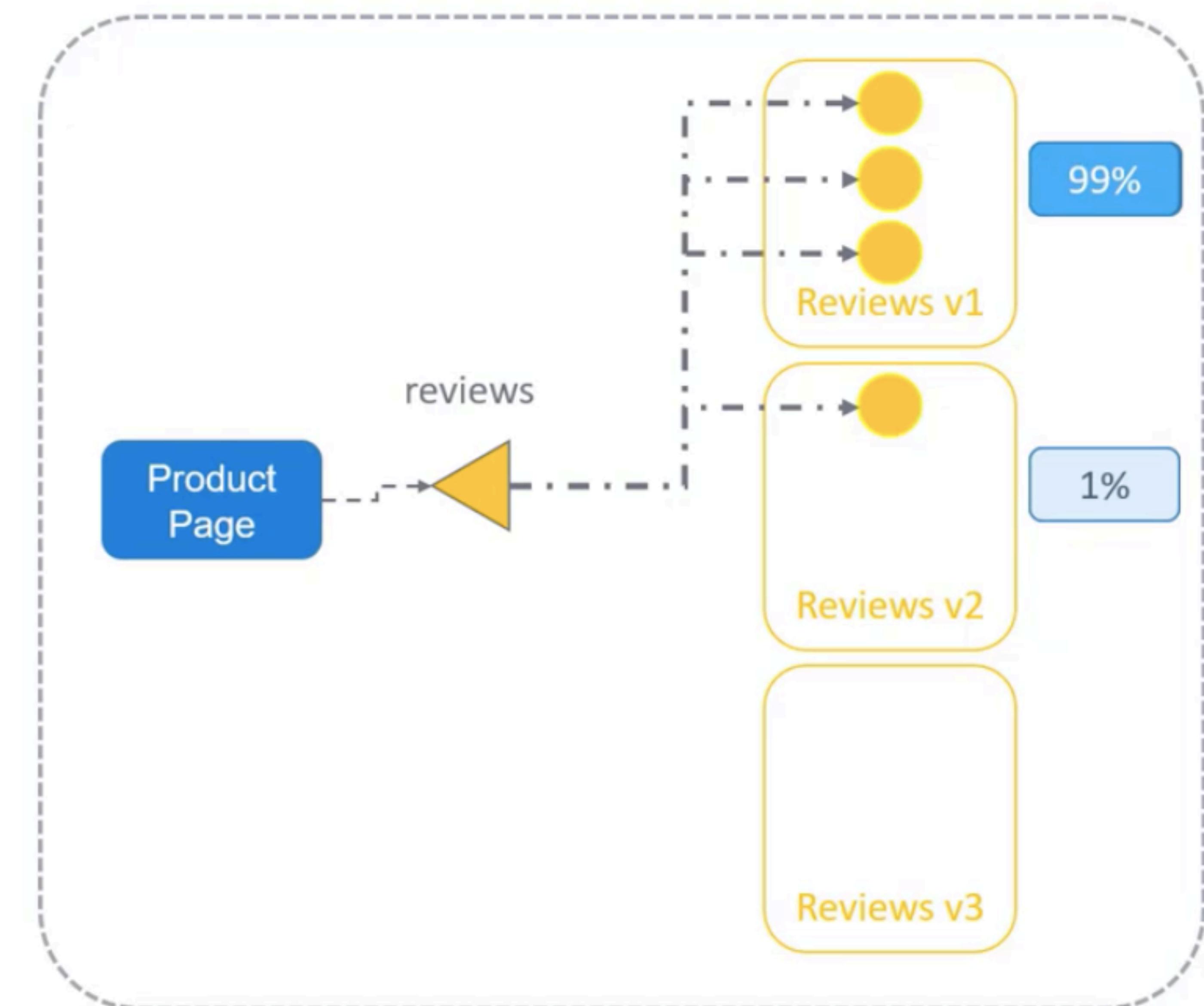
$ kubectl scale deployment reviews-v2 --replicas=0
deployment.apps/reviews-v2 scaled

$ kubectl scale deployment reviews-v1 --replicas=0
deployment.apps/reviews-v1 scaled
```

review-service.yaml

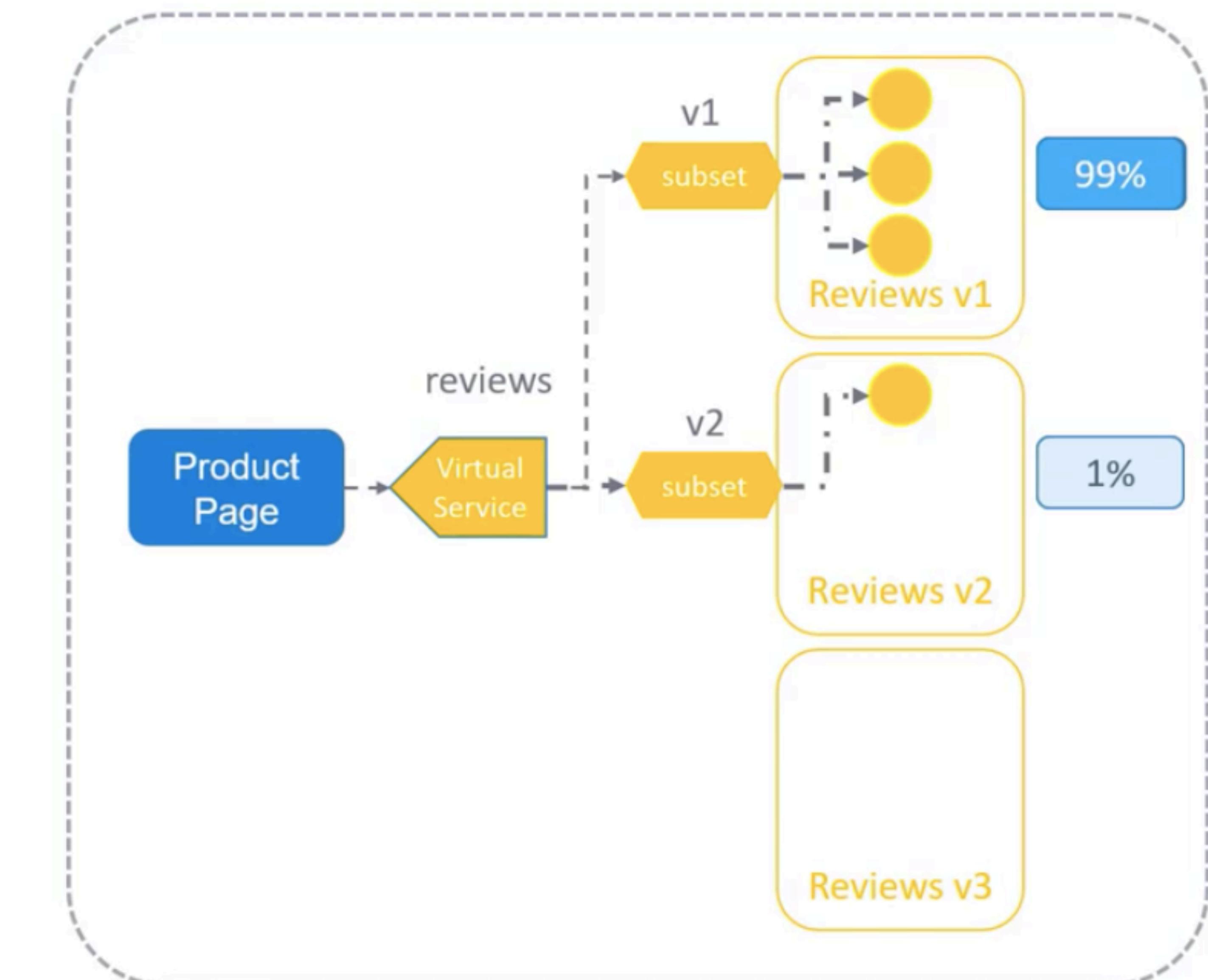
```
apiVersion: v1
kind: Service
metadata:
  name: reviews
spec:
  ports:
  - port: 9080
    name: http
selector:
  { app: reviews }
```





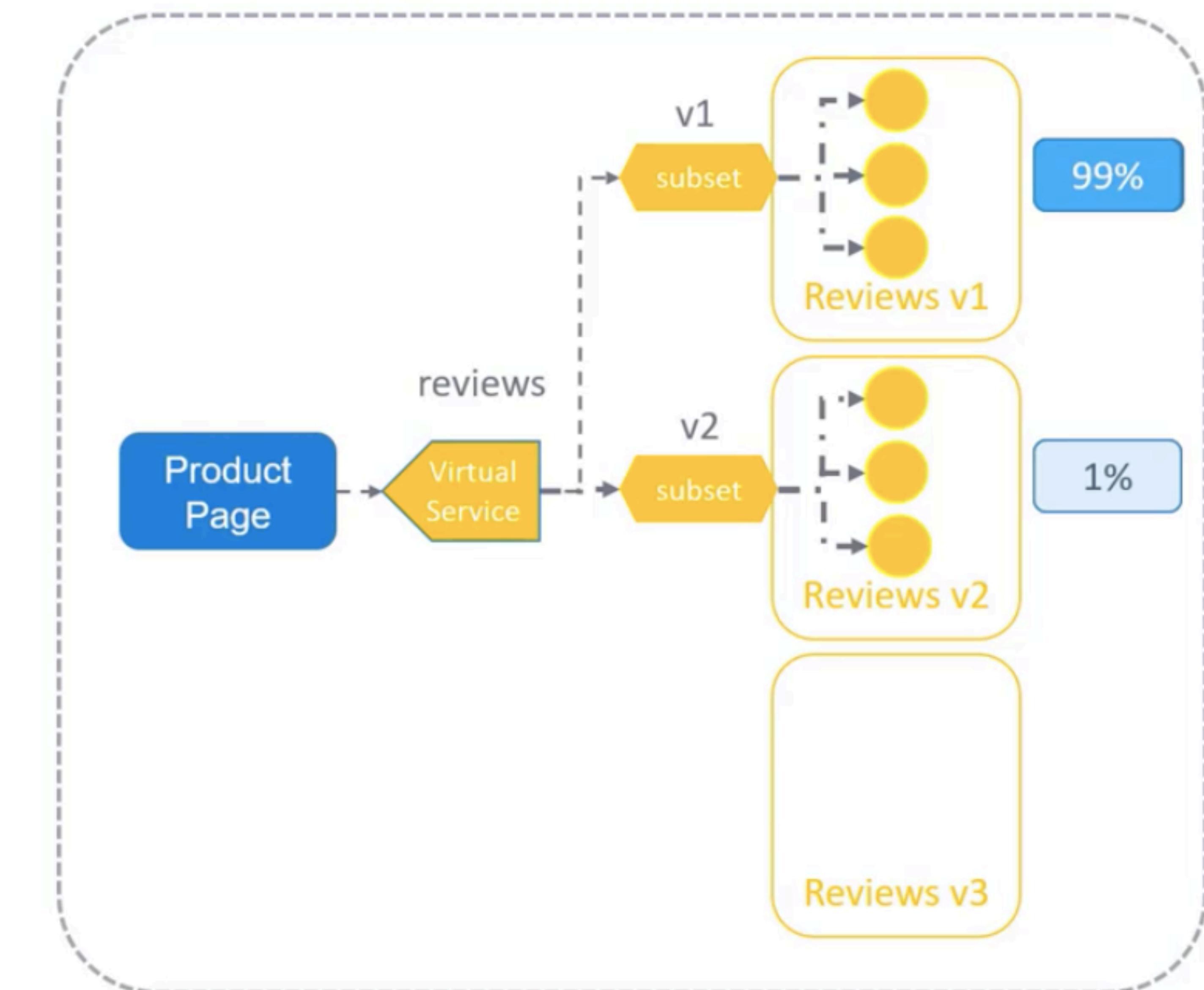
review-service.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: reviews
spec:
  hosts:
    - reviews
  http:
    - route:
        - destination:
            host: reviews
            subset: v1
            weight: 99
        - destination:
            host: reviews
            subset: v2
            weight: 1
```



review-service.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: reviews
spec:
  hosts:
    - reviews
  http:
    - route:
        - destination:
            host: reviews
            subset: v1
            weight: 99
        - destination:
            host: reviews
            subset: v2
            weight: 1
```



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localhost:20001/kiali/console/namespaces/default/istio/virtualservices/reviews

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Istio Config

Istio Config > Namespace: default > VirtualService > reviews

Actions

YAML

```
1 kind: VirtualService
2 apiVersion: networking.istio.io/v1alpha3
3 metadata:
4   name: reviews
5   namespace: default
6   uid: d083b172-395e-47fe-83f2-a8e9f03e015e
7   resourceVersion: '9666'
8   generation: 1
9   creationTimestamp: '2021-08-14T00:49:11Z'
10  annotations:
11    kubectl.kubernetes.io/last-applied-configuration: >
12      {"apiVersion":"networking.istio.io/v1alpha3","kind":"VirtualService","metadata":{"annotations":{},"name":"reviews","namespace":"default"},"spec":{"hosts":["reviews"],"http":[{"route":[{"destination":{"host":"reviews","subset":"v1","weight":75}, {"destination":{"host":"reviews","subset":"v2"}, "weight":25}}]}]}
13  managedFields: []
14  spec:
15    hosts:
16      - reviews
17    http:
18      - route:
19        - destination:
20          host: reviews
21          subset: v1
22          weight: 75
23        - destination:
24          host: reviews
25          subset: v2
26          weight: 25
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
```

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localhost:20001/kiali/console/namespaces/default/istio/destinationrules/reviews

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Overview Graph Applications Workloads Services **Istio Config**

Istio Config > Namespace: default > DestinationRule > reviews

Actions

YAML

```
1 kind: DestinationRule
2 apiVersion: networking.istio.io/v1alpha3
3 - metadata:
4   name: reviews
5   namespace: default
6   uid: c6c0b84c-b264-40fe-bb25-61cf563ababf
7   resourceVersion: '9596'
8   generation: 1
9   creationTimestamp: '2021-08-14T00:46:09Z'
10  annotations:
11    kubectl.kubernetes.io/last-applied-configuration: >
12      {"apiVersion":"networking.istio.io/v1alpha3","kind":"DestinationRule","metadata":{"annotations":{},"name":"reviews","namespace":"default"},"spec":{"host":"reviews","subsets":[{"labels":{"version":"v1"}, "name":"v1"}, {"labels":{"version":"v2"}, "name":"v2"}, {"labels":{"version":"v3"}, "name":"v3"}]}}
13  managedFields: []
14  spec:
15    host: reviews
16    subsets:
17      - labels:
18        version: v1
19        name: v1
20      - labels:
21        version: v2
22        name: v2
23      - labels:
24        version: v3
25        name: v3
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
```

Destination Rule Overview

Host reviews

| Status | Name | Labels | Traffic Policy |
|--------|------|---------|----------------|
| ✓ | v1 | version | v1 |
| ✓ | v2 | version | v2 |
| ✓ | v3 | version | v3 |

Save Reload Cancel Close Overview

BookInfo Sample

The Comedy of Errors

summary: Wikipedia Summary: The Comedy of Errors is one of William Shakespeare's early plays. It is his shortest and one of his most farcical comedies, with a major part of the humour coming from slapstick and mistaken identity, in addition to puns and word play.

Book Details

Type: paperback
Pages: 100
Publisher: publisherA
Language: English
ISBN-10: 234567890
ISBN-13: 978-1234567890

Book Reviews

An extremely entertaining play by Shakespeare. The slapstick humour is refreshing!
— Reviewer1

Absolutely fun and entertaining. The play lacks thematic depth when compared to other plays by Shakespeare.
— Reviewer2

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paperback

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200

Publisher:

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Language:

English

ISBN-10:

1234567890

ISBN-13:

123-1234567890

Book Reviews

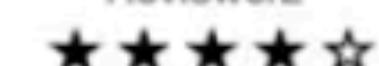
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Kiali Console Simple Bookstore App localhost:20001/kiali/console/namespaces/default/istio/virtualservices/reviews

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Istio Config

Istio Config > Namespace: default > VirtualService > reviews

Changes applied on default / virtualservices / reviews

YAML

```
1 kind: VirtualService
2 apiVersion: networking.istio.io/v1alpha3
3 metadata:
4   name: reviews
5   namespace: default
6   uid: d083b172-395e-47fe-83f2-a8e9f03e015e
7   resourceVersion: '19352'
8   generation: 2
9   creationTimestamp: '2021-08-14T00:49:11Z'
10 annotations:
11   kubectl.kubernetes.io/last-applied-configuration: >
12     {"apiVersion":"networking.istio.io/v1alpha3","kind":"VirtualService","metadata":{"annotations":{},"name":"reviews","namespace":"default"},"spec":{"hosts":["reviews"],"http":[{"route":[{"destination":{"host":"reviews","subset":"v1","weight":75},{"destination":{"host":"reviews","subset":"v2"}, "weight":25}}]}]}
13 managedFields: []
14 spec:
15   hosts:
16     - reviews
17   http:
18     - route:
19       - destination:
20         host: reviews
21         subset: v1
22         weight: 60
23       - destination:
24         host: reviews
25         subset: v2
26         weight: 20
27       - destination:
28         host: reviews
29         subset: v3
30         weight: 20
31
32
33
34
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52
```

Virtual Service Overview

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BookInfo Sample

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Pages:

200

Publisher:

PublisherA

Language:

English

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1234567890

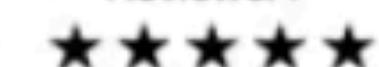
ISBN-13:

123-1234567890

Book Reviews

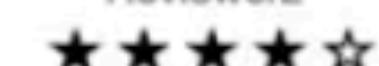
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Absolutely fun and entertaining. The play lacks thematic depth when compared to other plays by Shakespeare.

— Reviewer2



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Publisher: PublisherA

Language: English

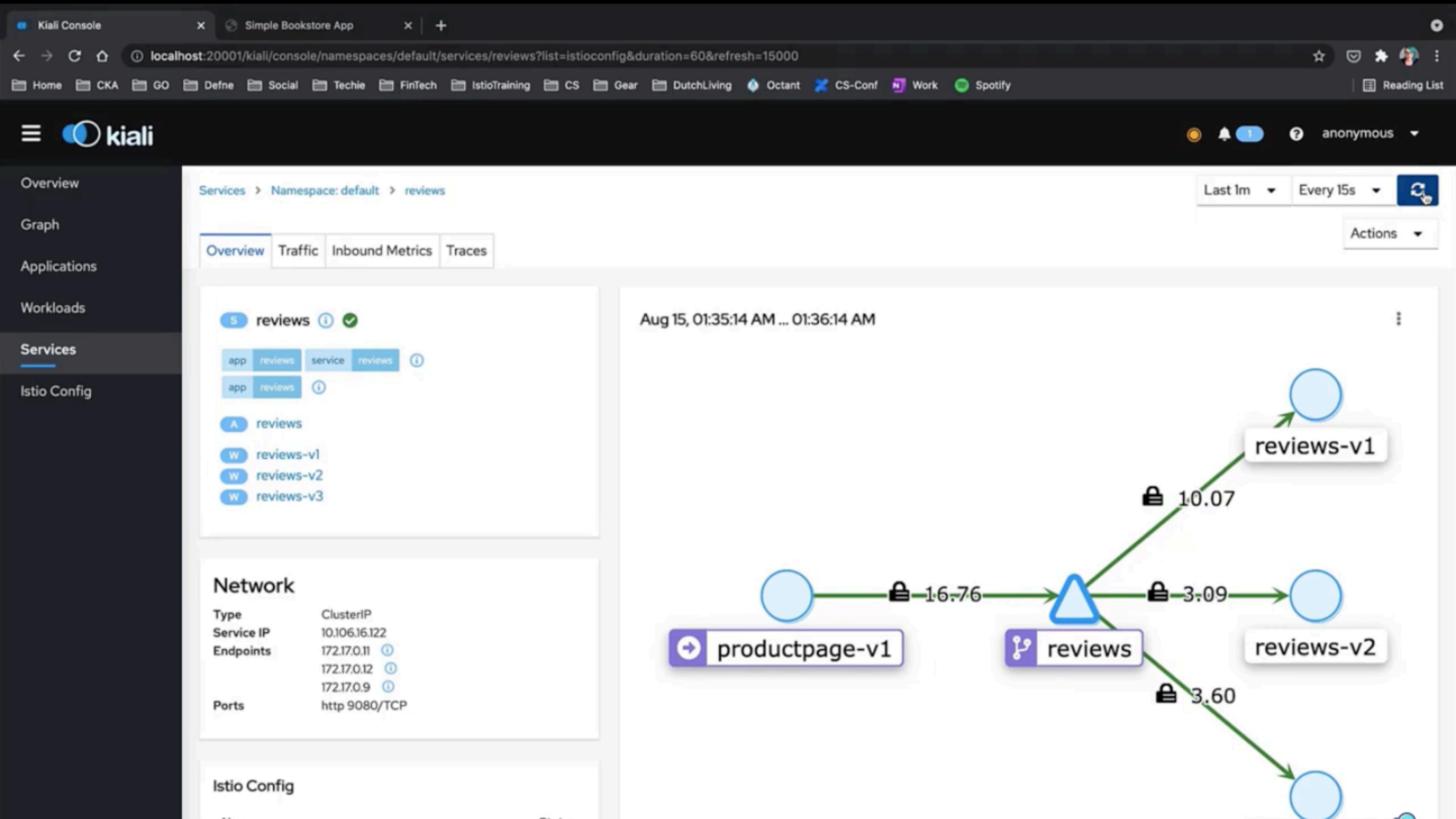
ISBN-10: 1234567890

ISBN-13: 123-1234567890

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★★★★★

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— Reviewer2
★★★★★



Kiali Console Simple Bookstore App

localhost:20001/kiali/console/namespaces/default/istio/virtualservices/reviews

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YAML

Actions

```
1 kind: VirtualService
2 apiVersion: networking.istio.io/v1alpha3
3 metadata:
4   name: reviews
5   namespace: default
6   uid: d083b172-395e-47fe-83f2-a8e9f03e015e
7   resourceVersion: '19637'
8   generation: 3
9   creationTimestamp: '2021-08-14T00:49:11Z'
10  annotations:
11    kubectl.kubernetes.io/last-applied-configuration: >
12      {"apiVersion":"networking.istio.io/v1alpha3","kind":"VirtualService","metadata":{"annotations":{},"name":"reviews","namespace":"default"},"spec":{"hosts":["reviews"],"http":[{"route":[{"destination":{"host":"reviews","subset":"v1","weight":75}, {"destination":{"host":"reviews","subset":"v2","weight":25}}]}]}}}
13  managedFields: []
14  spec:
15    hosts:
16      - reviews
17    http:
18      - route:
19          - destination:
20              host: reviews
21              subset: v1
22              weight: 99
23          - destination:
24              host: reviews
25              subset: v2
26              weight: 1
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
```

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Kiali Console Simple Bookstore App localhost:20001/kiali/console/namespaces/default/services/reviews?list=istioconfig&duration=60&refresh=15000

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Services > Namespace: default > reviews

Last 1m Every 15s

Actions

reviews (s) app reviews service reviews app reviews A reviews W reviews-v1 W reviews-v2 W reviews-v3

Aug 15, 01:39:07 AM ... 01:40:07 AM

Network

| | |
|------------|---|
| Type | ClusterIP |
| Service IP | 10.106.16.122 |
| Endpoints | 172.17.0.11 i 172.17.0.12 i 172.17.0.9 i |
| Ports | http 9080/TCP |

productpage-v1 → **reviews** (19.38) → **reviews-v1** (19.22) → **reviews-v2** (0.16)

reviews-v1

reviews-v2

This screenshot of the Kiali Console shows the traffic flow for the 'reviews' service in the 'default' namespace. The 'Overview' tab is selected. The 'reviews' service is highlighted, showing its various versions: reviews (s), app reviews, service reviews, app reviews, A reviews, W reviews-v1, W reviews-v2, and W reviews-v3. The 'Network' section provides details about the service's type (ClusterIP), service IP (10.106.16.122), endpoints (172.17.0.11, 172.17.0.12, 172.17.0.9), and port (http 9080/TCP). The main panel displays a network diagram with 'productpage-v1' (purple box) sending traffic to 'reviews' (purple box). The 'reviews' box has two outgoing connections: one to 'reviews-v1' (green box) labeled '19.22' and another to 'reviews-v2' (green box) labeled '0.16'. The 'reviews-v1' box is also connected to a blue circle. The 'Actions' dropdown is open, showing 'Last 1m' and 'Every 15s' options. The top navigation bar shows the URL as 'localhost:20001/kiali/console/namespaces/default/services/reviews?list=istioconfig&duration=60&refresh=15000'.

Kiali Console

Simple Bookstore App

localhost:20001/kiali/console/namespaces/default/istio/virtualservices/reviews

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Istio Config

Istio Config > Namespace: default > VirtualService > reviews

YAML *

```
1 kind: VirtualService
2 apiVersion: networking.istio.io/v1alpha3
3 - metadata:
4   name: reviews
5   namespace: default
6   uid: d083b172-395e-47fe-83f2-a8e9f03e015e
7   resourceVersion: '23071'
8   generation: 16
9   creationTimestamp: '2021-08-14T00:49:11Z'
10  annotations:
11    kubectl.kubernetes.io/last-applied-configuration: >
12      {"apiVersion":"networking.istio.io/v1alpha3","kind":"VirtualService","metadata":{"annotations":{},"name":"reviews","namespace":"default"},"spec":{"hosts":["reviews"],"http":[{"route":[{"destination":{"host":"reviews","subset":"v1","weight":75}, {"destination":{"host":"reviews","subset":"v2"}, "weight":25}}]}]}
13  managedFields: []
14  spec:
15    hosts:
16      - reviews
17    http:
18      - route:
19        - destination:
20          host: reviews
21          subset: v1
```

Actions

Virtual Service Overview

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localhost:20001/kiali/console/namespaces/default/istio/virtualservices/reviews

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Overview Graph Applications Workloads Services Istio Config

Istio Config > Namespace: default > VirtualService > reviews

Actions

YAML

```
1 kind: VirtualService
2 apiVersion: networking.istio.io/v1alpha3
3 metadata:
4   name: reviews
5   namespace: default
6   uid: d083b172-395e-47fe-83f2-a8e9f03e015e
7   resourceVersion: '23244'
8   generation: 18
9   creationTimestamp: '2021-08-14T00:49:11Z'
10  annotations:
11    kubectl.kubernetes.io/last-applied-configuration: >
12      {"apiVersion":"networking.istio.io/v1alpha3","kind":"VirtualService","metadata":{"annotations":{},"name":"reviews","namespace":"default"},"spec":{"hosts":["reviews"],"http":[{"route":[{"destination":{"host":"reviews","subset":"v1","weight":75}, {"destination":{"host":"reviews","subset":"v2"}, "weight":25}}]}]}
13  managedFields: []
14  spec:
15    hosts:
16      - reviews
17    http:
18      - match:
19          - headers:
20              end-user:
21                  exact: kodekloud
22          route:
23              - destination:
24                  host: reviews
25                  subset: v2
26              - route:
27                  - destination:
28                      host: reviews
29                      subset: v1
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
```

Virtual Service Overview

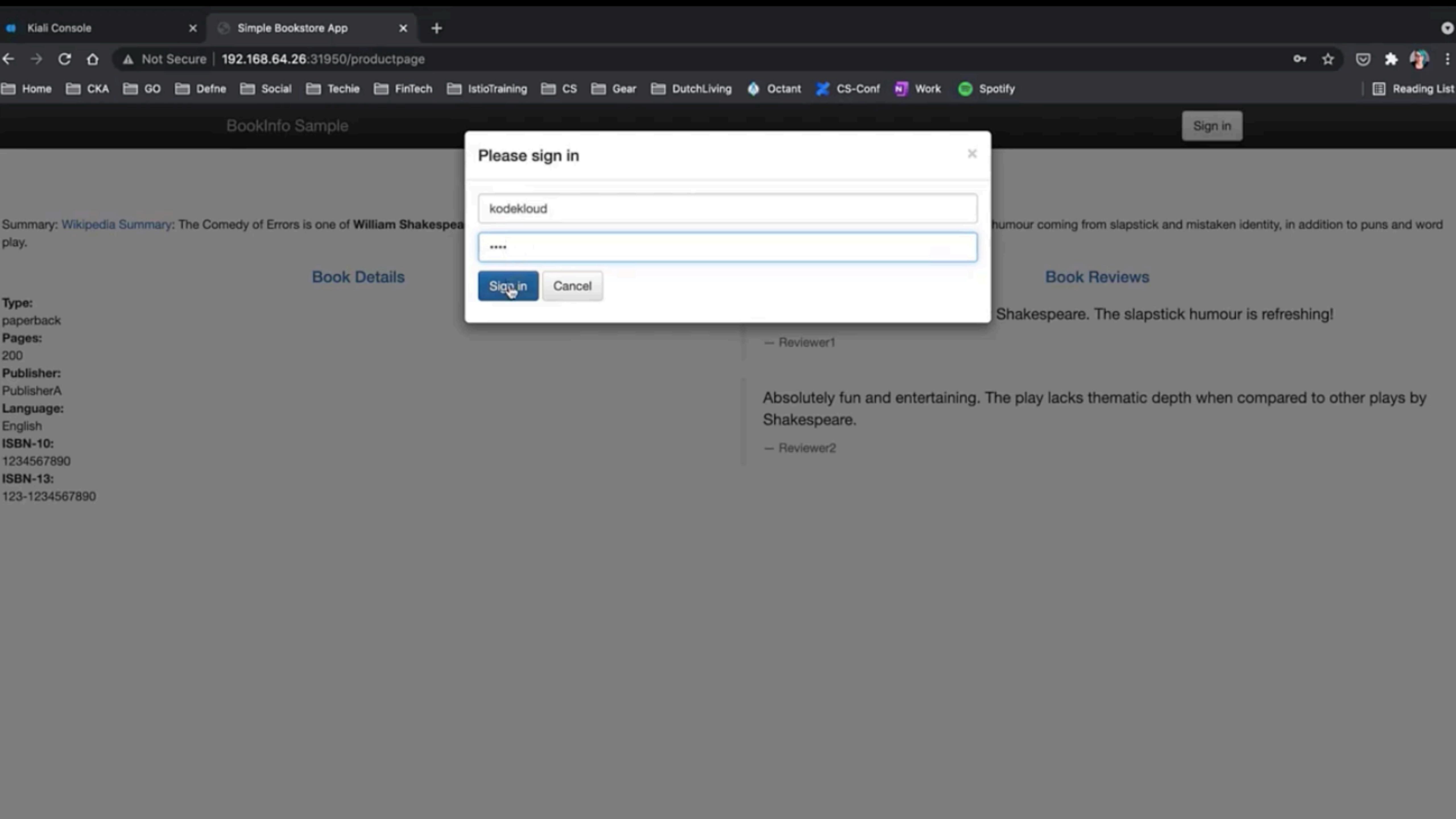
HTTP Routes

| | | | | |
|---|----|----|----|-----|
| 0 | 25 | 50 | 75 | 100 |
|---|----|----|----|-----|

Hosts

reviews

Save Reload Cancel Close Overview



Kiali Console

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BookInfo Sample

kodekloud (sign out)

The Comedy of Errors

Summary: Wikipedia Summary: The Comedy of Errors is one of William Shakespeare's early plays. It is his shortest and one of his most farcical comedies, with a major part of the humour coming from slapstick and mistaken identity, in addition to puns and word play.

Book Details

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★★★★★

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localhost:20001/kiali/console/namespaces/default/istio/virtualservices/reviews

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anonymous

Overview Graph Applications Workloads Services Istio Config

Istio Config > Namespace: default > VirtualService > reviews

Actions

YAML

```
6 uid: d083b172-395e-47fe-83f2-a8e9f03e015e
7 resourceVersion: '23375'
8 generation: 19
9 creationTimestamp: '2021-08-14T00:49:11Z'
10 annotations:
11   kubectl.kubernetes.io/last-applied-configuration: >
12     {"apiVersion":"networking.istio.io/v1alpha3","kind":"VirtualService","metadata":{"annotations":{},"name":"reviews","namespace":"default"},"spec":{"hosts":["reviews"],"http":[{"route":[{"destination":{"host":"reviews","subset":"v1","weight":75}, {"destination":{"host":"reviews","subset":"v2"}, "weight":25}]}]}}
13 managedFields: []
14 spec:
15   hosts:
16     - reviews
17   http:
18     - match:
19       - headers:
20         end-user:
21           exact: kodekloud
22       route:
23         - destination:
24           host: reviews
25           subset: v2
26     - match:
27       - headers:
28         end-user:
29           exact: testuser
30       route:
31         - destination:
32           host: reviews
33           subset: v3
34     - route:
35       - destination:
36           host: reviews
37           subset: v1
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
```

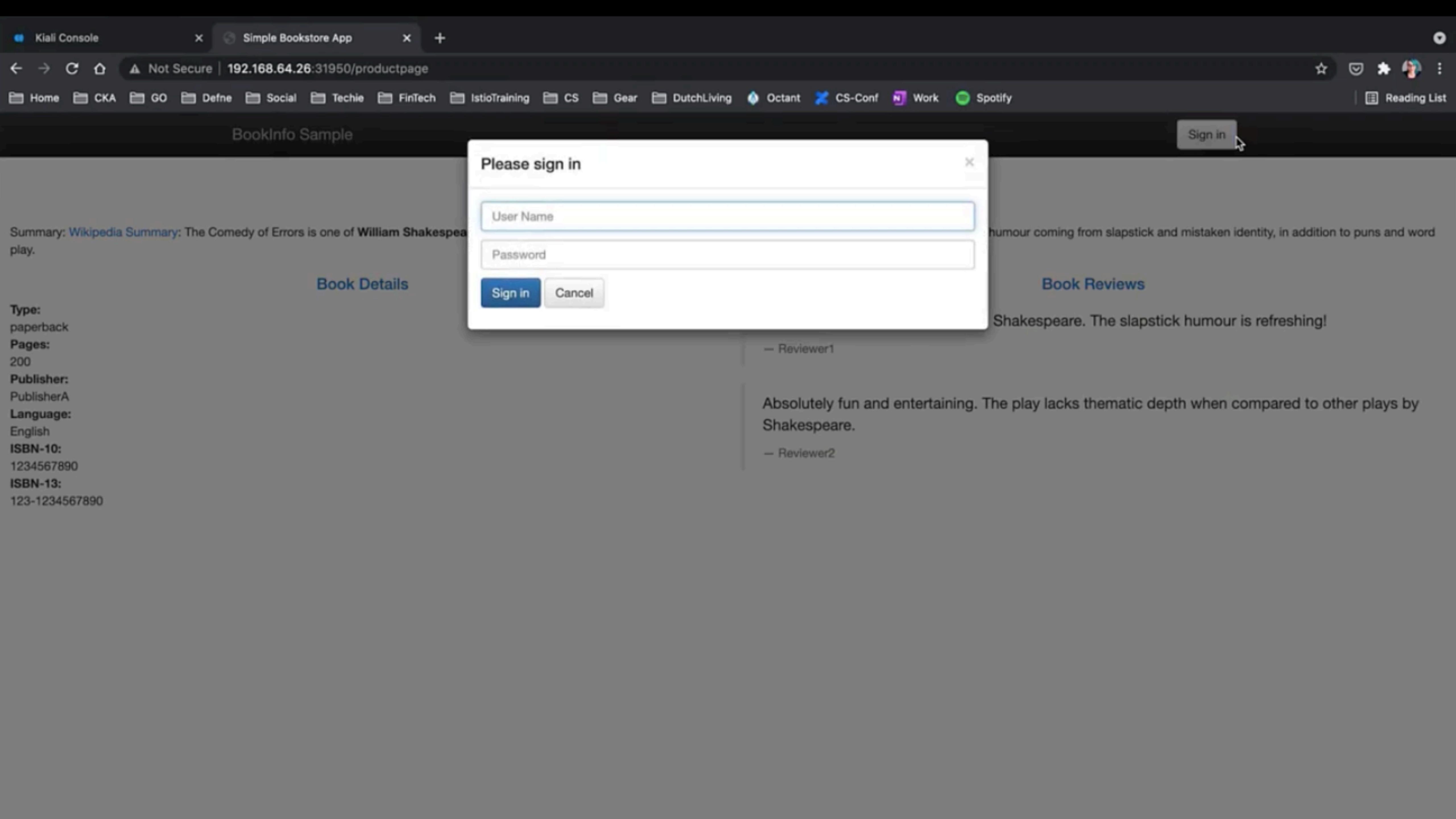
Virtual Service Overview

HTTP Routes

Hosts

reviews

Save Reload Cancel Close Overview



Kiali Console

Simple Bookstore App

Not Secure | 192.168.64.26:31950/productpage

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BookInfo Sample testuser (sign out)

The Comedy of Errors

Summary: [Wikipedia Summary](#): The Comedy of Errors is one of William Shakespeare's early plays. It is his shortest and one of his most farcical comedies, with a major part of the humour coming from slapstick and mistaken identity, in addition to puns and word play.

Book Details

Type: paperback

Pages: 200

Publisher: PublisherA

Language: English

ISBN-10: 1234567890

ISBN-13: 123-1234567890

Book Reviews

An extremely entertaining play by Shakespeare. The slapstick humour is refreshing!
— Reviewer1
★★★★★

Absolutely fun and entertaining. The play lacks thematic depth when compared to other plays by Shakespeare.
— Reviewer2
★★★★★

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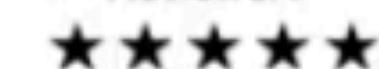
ISBN-13:

123-1234567890

Book Reviews

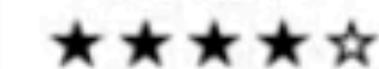
An extremely entertaining play by Shakespeare. The slapstick humour is refreshing!

— Reviewer1



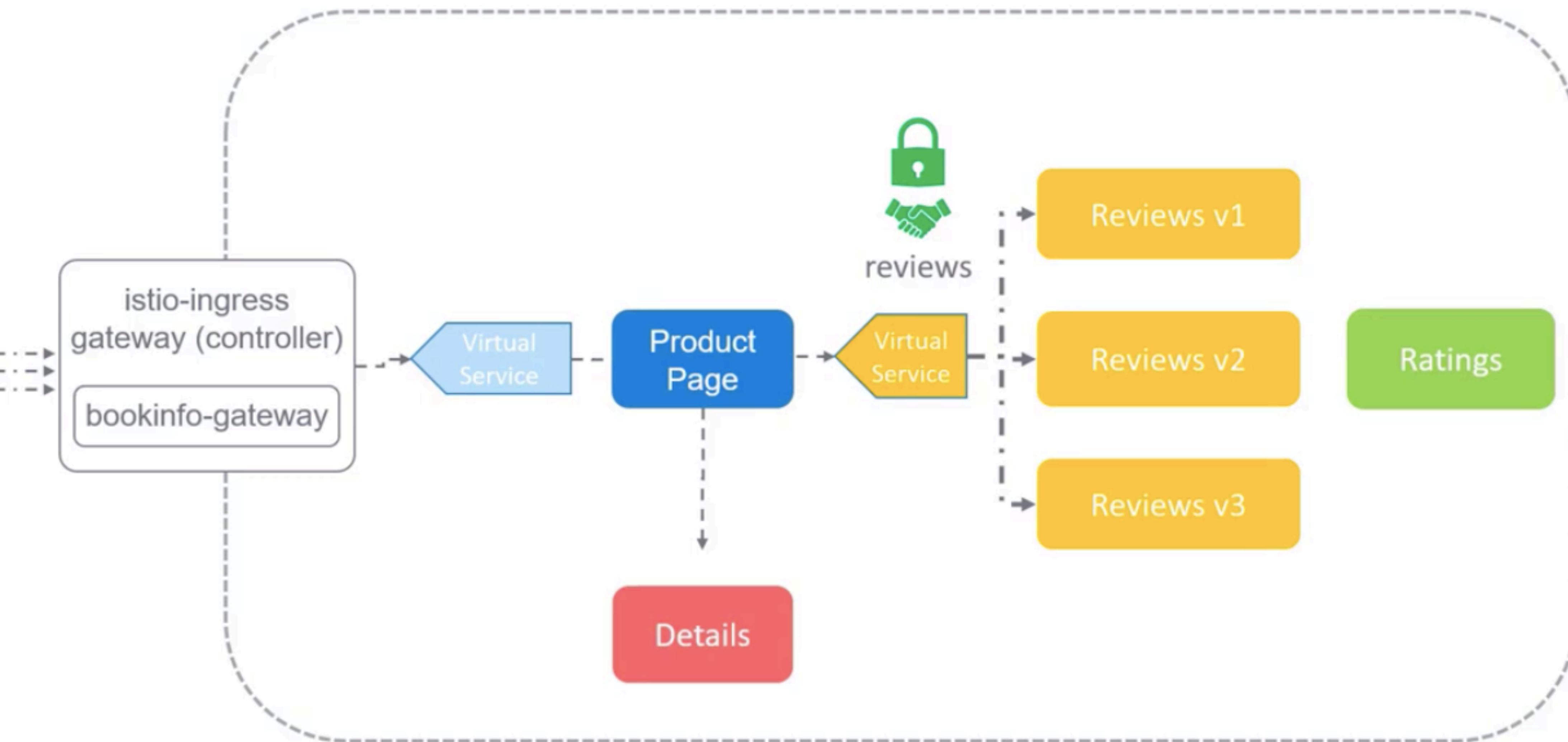
Absolutely fun and entertaining. The play lacks thematic depth when compared to other plays by Shakespeare.

— Reviewer2



Fault Injection

Istio Virtual Services



fault-injection.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: my-service
spec:
  hosts:
  - my-service
  http:
  - fault:
      delay:
        percentage:
          value: 0.1
        fixedDelay: 5s
  route:
  - destination:
      host: my-service
      subset: v1
```

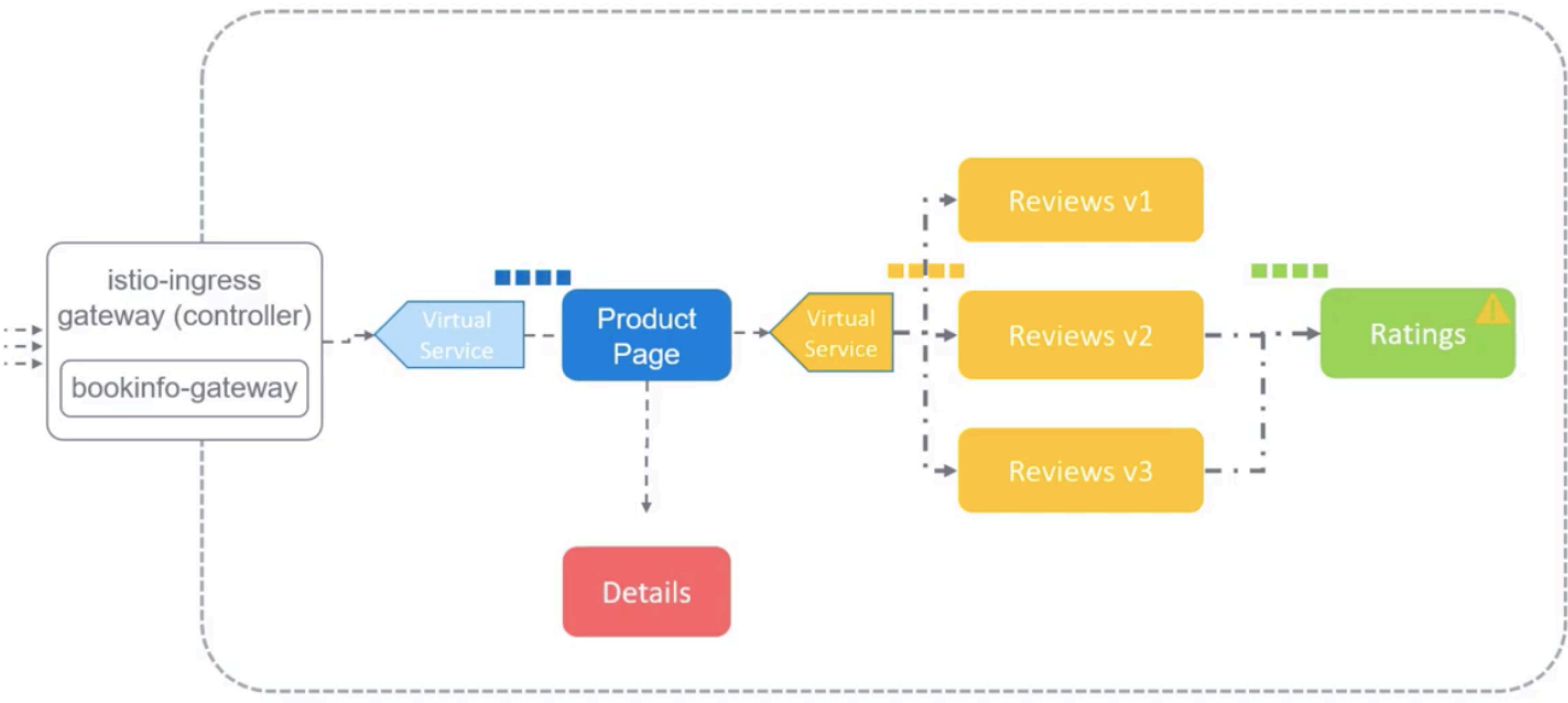
fault-injection.yaml

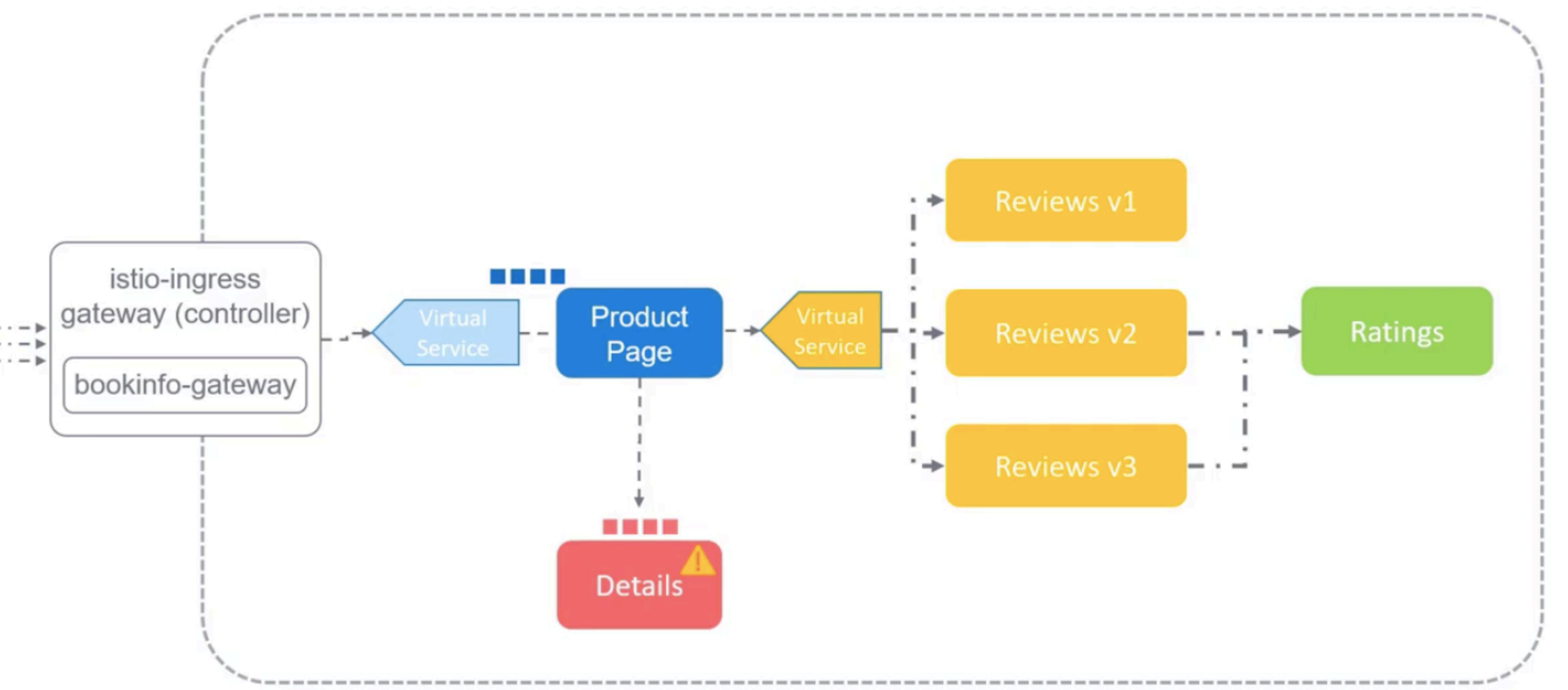
```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: my-service
spec:
  hosts:
    - my-service
  http:
    - fault:
        delay:
          percentage:
            value: 0.1
            fixedDelay: 5s
        route:
          - destination:
              host: my-service
              subset: v1
    
```



```
        abort:
          percentage:
            value: 0.1
            httpStatus: 400
    
```

Timeouts





book-info.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: bookinfo
spec:
  hosts:
    - "bookinfo.app"
  gateways:
    - bookinfo-gateway
  http:
    - match:
        - uri:
            exact: /productpage
        - uri:
            prefix: /static
    <code hidden>
  route:
    - destination:
        host: productpage
        port:
          number: 9080
    timeout: 3s
```

details-service.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: details
spec:
  hosts:
    - details
  http:
    - route:
        - destination:
            host: details
            subset: v1
```

book-info.yaml

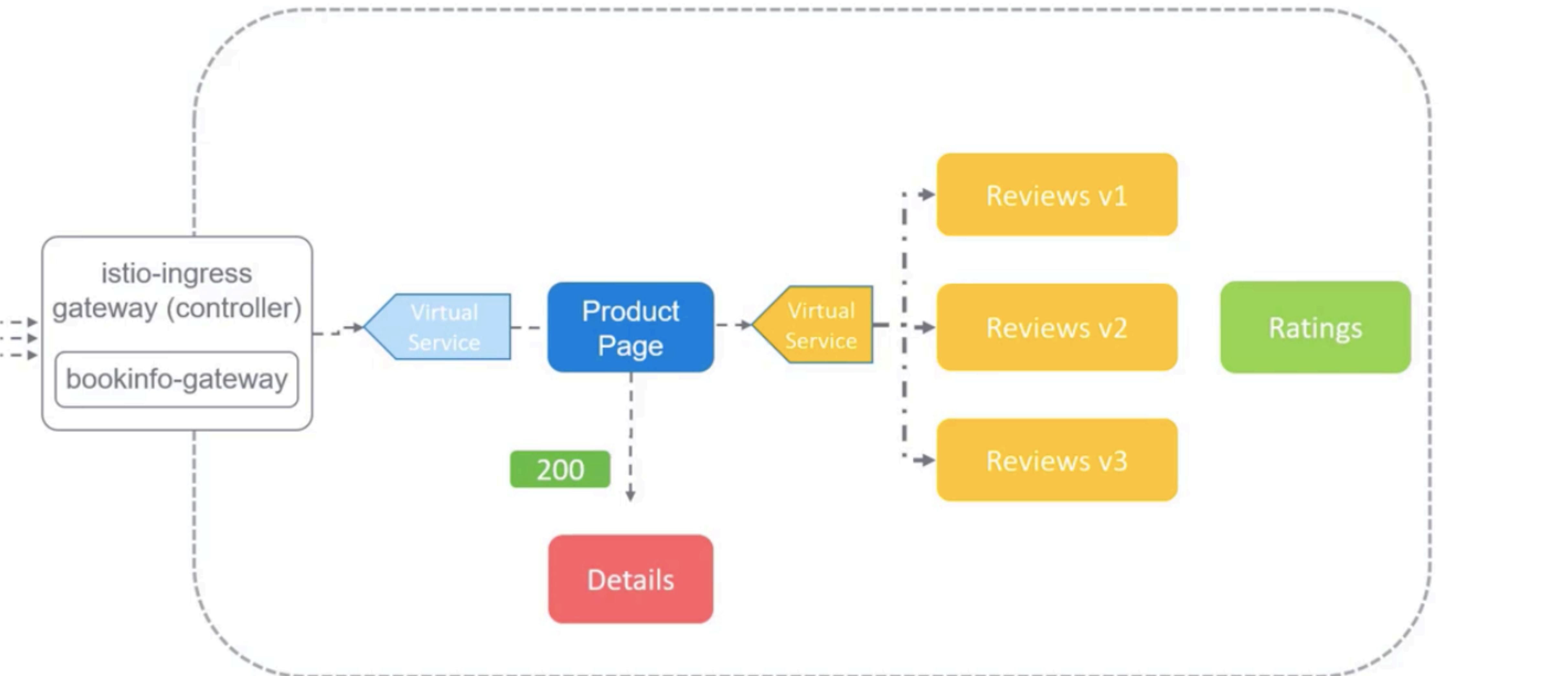
```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: bookinfo
spec:
  hosts:
    - "bookinfo.app"
  gateways:
    - bookinfo-gateway
  http:
    - match:
        - uri:
            exact: /productpage
        - uri:
            prefix: /static
      <code hidden>
    route:
      - destination:
          host: productpage
          port:
            number: 9080
      timeout: 3s
```

details-service.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: details
spec:
  hosts:
    - details
  http:
    - route:
        - destination:
            host: details
            subset: v1
  fault:
    delay:
      fixedDelay: 5s
      percent: 50
```

Retries

Istio Virtual Services



Virtual-service-timeout.yaml

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: my-service
spec:
  hosts:
    - my-service
  http:
    - route:
        - destination:
            host: my-service
            subset: v1
  retries:
    attempts: 3
    perTryTimeout: 2s
```

ISTIO DEFAULTS

25ms+ intervals after 1st fail

2 retries before returning an error

Thank you