

# Alibaba Cloud

## Alibaba Cloud Service Mesh Quick Start

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# Document conventions

Style	Description	Example
 <b>Danger</b>	A danger notice indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 <b>Danger:</b> Resetting will result in the loss of user configuration data.
 <b>Warning</b>	A warning notice indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 <b>Warning:</b> Restarting will cause business interruption. About 10 minutes are required to restart an instance.
 <b>Notice</b>	A caution notice indicates warning information, supplementary instructions, and other content that the user must understand.	 <b>Notice:</b> If the weight is set to 0, the server no longer receives new requests.
 <b>Note</b>	A note indicates supplemental instructions, best practices, tips, and other content.	 <b>Note:</b> You can use Ctrl + A to select all files.
>	Closing angle brackets are used to indicate a multi-level menu cascade.	Click <b>Settings</b> > <b>Network</b> > <b>Set network type</b> .
<b>Bold</b>	Bold formatting is used for buttons, menus, page names, and other UI elements.	Click <b>OK</b> .
Courier font	Courier font is used for commands	Run the <code>cd /d C:/window</code> command to enter the Windows system folder.
<i>Italic</i>	Italic formatting is used for parameters and variables.	<code>bae log list --instanceid</code> <i>Instance_ID</i>
[] or [a b]	This format is used for an optional value, where only one item can be selected.	<code>ipconfig [-all -t]</code>
{ } or {a b}	This format is used for a required value, where only one item can be selected.	<code>switch {active stand}</code>

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# 1. Procedure

Alibaba Cloud Service Mesh (ASM) can simplify microservice management in the microservices model. This topic provides a quick-start tutorial to describe how to use ASM to manage applications.

## Context

The following figure shows the procedure for using ASM to manage applications.



**Note** Go to the [Container Service console](#) to [deploy applications in an ASM instance](#). Perform the other operations in the .

## Procedure

1. Create an ASM instance. For more information, see [Create an ASM instance](#).
2. Add a cluster to the ASM instance. For more information, see [Add a cluster to an ASM instance](#).
3. Deploy an ingress gateway in the cluster added to the ASM instance. For more information, see [Deploy an ingress gateway service](#).
4. Deploy applications in the ASM instance. For more information, see [Deploy an application in an ASM instance](#).
5. Define virtual services and an Istio gateway for the ASM instance. For more information, see [使用Istio资源实现版本流量路由](#).

## 2. Create an ASM instance

To use Alibaba Cloud Service Mesh (ASM), you must create an ASM instance. This topic describes how to create an ASM instance in the ASM console.

### Prerequisites

- The following services are activated:
  - [ASM](#)
  - [Auto Scaling \(ESS\)](#)
  - [Resource Access Management \(RAM\)](#)
  - (Optional) [Tracing Analysis](#)
- The permissions of the following roles are obtained: [AliyunServiceMeshDefaultRole](#), [AliyunCSClusterRole](#), and [AliyunCSManagedKubernetesRole](#).

### Context

 **Note** When you create and use an ASM instance, ASM may perform the following operations based on your settings:

- Creates a security group that allows access to a virtual private cloud (VPC) by using all Internet Control Message Protocol (ICMP) ports.
- Adds route entries to a VPC.
- Creates an elastic IP address (EIP).
- Creates a RAM role and policies, and attaches the policies to the RAM role to grant full permissions on Server Load Balancer (SLB), CloudMonitor, VPC, and Log Service. The RAM role allows ASM to dynamically create SLB instances and add route entries to a VPC based on your settings.
- Creates an internal-facing SLB instance to expose port 6443.
- Creates an internal-facing SLB instance to expose port 15011.
- Collects the logs of managed components to ensure stability when you use the ASM instance.

### Procedure

- 1.
- 2.
3. On the **Mesh Management** page, click **Create ASM Instance**.
4. On the **Create Service Mesh** page, set the parameters as required.
  - i. The following table describes the basic settings for an ASM instance.

Parameter	Description
Service mesh name	The name of the ASM instance.

Parameter	Description
Spec	The edition of the ASM instance. Valid values: <b>Standard Edition</b> , <b>Enterprise Edition</b> , and <b>Ultimate Edition</b> . For more information about the features of each edition, see the "Instance types" section of the <a href="#">Instance editions</a> topic.
Region	The region in which the ASM instance resides.
Payment type	<p>The billing method of the ASM instance. Valid values: <b>Pay as you go</b> and <b>Subscription</b>. If you set this parameter to <b>Subscription</b>, you must set the following parameters:</p> <div style="background-color: #e6f2ff; padding: 10px; margin: 10px 0;"> <p> <b>Note</b> If you set the <b>Payment type</b> parameter to <b>Subscription</b>, only the internal-facing SLB instances of the Istio control plane and API server are billed in subscription mode. The EIPs of the ASM instance and API server are still billed in pay-as-you-go mode.</p> </div> <ul style="list-style-type: none"> <li>■ <b>Purchase time</b>: the subscription period. Valid values: 1 month, 2 months, 3 months, 6 months, 1 year, 2 years, and 3 years.</li> <li>■ <b>Automatic renewal</b>: specifies whether to enable auto-renewal.</li> </ul>
Istio Version	The Istio version.
VPC	The VPC of the ASM instance. You can click <b>Create VPC</b> to create a VPC. For more information, see <a href="#">创建和管理专有网络</a> .
vSwitch	The vSwitch of the ASM instance. You can click <b>Create vSwitch</b> to create a vSwitch. For more information, see <a href="#">Work with vSwitches</a> .
Istio control plane access	The SLB instance that is used to control access to the Istio control plane.
API Server access	<p>The SLB instance that is used to control access to the API server. You can specify whether to enable access to the API server by using an EIP.</p> <ul style="list-style-type: none"> <li>■ If you select Use EIP to expose API Server, an EIP is created and associated with the internal-facing SLB instance. Then, you can use the kubeconfig file to connect to and manage the ASM instance over the Internet.</li> <li>■ If you clear Use EIP to expose API Server, no EIP is created. You can use the kubeconfig file to connect to and manage the ASM instance only in the VPC.</li> </ul>

Parameter	Description
Observability	<p>Specifies whether to enable Tracing Analysis for the ASM instance.</p> <p>ASM integrates with Tracing Analysis. Tracing Analysis provides a wide range of tools to help you efficiently identify the performance bottlenecks of distributed applications. For example, you can use these tools to map traces, display trace topologies, analyze application dependencies, and count the number of requests. This helps you improve the efficiency of developing and troubleshooting distributed applications. For more information about Tracing Analysis, see <a href="#">Use Tracing Analysis to trace applications inside and outside an ASM instance</a>.</p> <div style="border: 1px solid #add8e6; padding: 5px; background-color: #e0f0ff;"> <p> <b>Note</b> Before you enable Tracing Analysis, make sure that you have activated Tracing Analysis in the <a href="#">Tracing Analysis console</a>.</p> </div>
	<p>Specifies whether to enable Prometheus Service (Prometheus) for the ASM instance.</p> <p>For more information about Prometheus, see <a href="#">Monitor service meshes based on ARMS Prometheus</a> and <a href="#">Deploy a self-managed Prometheus instance to monitor ASM instances</a>.</p>
	<p>Specifies whether to enable Kiali for ASM.</p> <p>Kiali for ASM is a tool that is used to observe ASM instances. This tool provides a GUI that allows you to view services and configurations. Kiali for ASM is a built-in tool in ASM instances whose Istio version is 1.7.5.25 or later. For more information, see <a href="#">Enable Kiali for ASM to observe an ASM instance in the ASM console</a>.</p>
	<p>Specifies whether to enable collection of access logs. If access logs are collected, you can use Log Service to view the access logs of ingress gateway services.</p> <p>For more information about access logs, see <a href="#">Use Log Service to collect logs of ingress gateways on the data plane</a> and <a href="#">Use Log Service to collect access logs of the data plane</a>.</p>
	<p>Specifies whether to enable collection of control plane logs.</p> <p>ASM can collect logs of the control plane and generate alerts based on the logs. For example, ASM can collect logs related to configuration push from the control plane to the sidecar proxies on the data plane. For more information, see <a href="#">Enable collection of control plane logs and control plane alerting</a>.</p>

Parameter	Description
Mesh Audit	<p>Specifies whether to enable the mesh audit feature.</p> <p>You can enable the mesh audit feature to record and trace the operations of users. This is an important O&amp;M feature that ensures cluster security.</p> <p>For more information about the mesh audit feature, see <a href="#">Use the KubeAPI operation audit feature in ASM</a>.</p>
Resource configuration	<p>Specifies whether to enable version control for custom Istio resources.</p> <p>When you update fields in the <code>spec</code> block of an Istio resource, ASM records the resource version before the update. ASM stores up to five latest versions. For more information about how to roll back an Istio resource to an earlier version, see <a href="#">Roll back an Istio resource to an earlier version</a>.</p>
	<p>Specifies whether to allow access to Istio resources by using the Kubernetes API of clusters on the data plane.</p> <p>ASM allows you to create, delete, modify, and query Istio resources by using the Kubernetes API of clusters on the data plane. For more information, see <a href="#">Use the Kubernetes API of clusters on the data plane to access Istio resources</a>.</p>
Cluster Domain	<p>The cluster domain for the ASM instance. Default value: cluster.local. You can add only Kubernetes clusters that share the same cluster domain with the ASM instance to the ASM instance.</p> <div style="background-color: #e6f2ff; padding: 10px; border: 1px solid #d9e1f2;"> <p> <b>Note</b> You can set this parameter only if the Istio version of the ASM instance is 1.6.4.5 or later. Otherwise, this parameter is unavailable.</p> </div>

5. Activate ASM in pay-as-you-go mode.

If you create an ASM instance of a commercial edition for the first time, the value in the **State** column on the right of **Dependency Check** is **Not pass**. In this case, you must activate ASM in pay-as-you-go mode.

Click **Activate now** in the **Illustrate** column on the right of **Dependency Check**. On the page that appears, select **ASM (Pay-as-you-go) Terms of Service** and click **Activate Now**. Return to the **Create Service Mesh** page and click **Check again for ASM service activation check**. **Pass** is displayed in the **State** column.

6. Select **I have understood and accepted the Service Agreement and have read and agreed Alibaba Cloud Service Mesh ASM Service Level Agreement**.

7. Click **Create Service Mesh**.

 **Note** It takes about 2 to 3 minutes to create an ASM instance.

## Result

After the ASM instance is created, you can view information about the instance by performing the following operations:

- On the **Mesh Management** page, view the basic information about the ASM instance.

To view the latest information about the ASM instance, click the  icon on the right.

- On the **Mesh Management** page, find the ASM instance and click **Log** in the **Actions** column. In the ASM Instance Logs panel, you can view the logs of the ASM instance.
- On the **Mesh Management** page, find the ASM instance and click **Specification change** in the **Actions** column to update the instance type. For more information, see [升级ASM实例](#).
- On the **Mesh Management** page, find the ASM instance and click **Manage** in the **Actions** column. On the Basic Information page, you can view the basic information of the instance, such as the instance ID and the security group.

By default, the system creates five namespaces for a new ASM instance. Only the `istio-system` and `default` namespaces can be viewed in the ASM console. You can use the `kubectl` client to query and manage all namespaces, including `istio-system`, `kube-node-lease`, `kube-public`, `kube-system`, and `default`.

# 3. Add a cluster to an ASM instance

Applications that are deployed in an Alibaba Cloud Service Mesh (ASM) instance run in clusters. To use an ASM instance to manage applications, you must add a Container Service for Kubernetes (ACK) cluster to the ASM instance.

## Prerequisites

- An ASM instance is created. For more information, see [Create an ASM instance](#).
- An ACK cluster is created. For more information, see [Create an ACK dedicated cluster](#) and [Create an ACK managed cluster](#).
- The API server of the ACK cluster can be accessed from the Internet, or the cluster resides in the same virtual private cloud (VPC) as the ASM instance.

## Procedure

- 1.
- 2.
- 3.
- 4.
5. In the **Add Cluster** panel, select the cluster to be added to the ASM instance and click **OK**.

### Note

- If your application runs in a single cluster or multiple clusters in a VPC, we recommend that you select **Clusters in the Same VPC as the ASM Instance** to filter clusters.
- Make sure that the proxy container of the cluster to be added to the ASM instance can access Istio Pilot of the ASM instance. If Istio Pilot of the ASM instance does not allow Internet access, make sure that it can be accessed by the proxy container in the VPC.

6. In the **Note** message, click **OK**.

## Result

After you add a cluster to the ASM instance, the status of the ASM instance changes to **Updating**. Wait a few seconds and click the **Refresh** icon in the upper-right corner. If the cluster is added to the ASM instance, the status of the ASM instance becomes **Running**. You can add multiple clusters to the ASM instance at a time. The waiting duration may vary with the number of clusters that you add. On the **Kubernetes Clusters** page, you can view the information about the added cluster.

# 4. Deploy an ingress gateway service

To allow Internet access to an application in an Alibaba Cloud Service Mesh (ASM) instance, you must deploy an ingress gateway service in the cluster in which the application resides. This topic describes how to deploy an ingress gateway service in a Container Service for Kubernetes (ACK) cluster that is added to an ASM instance.

## Prerequisites

An ASM instance is created, and an ACK cluster is added to the ASM instance.

## Context

An ingress gateway service provides a unified entrance for routing the inbound traffic at Layer 7. It routes HTTP requests from the same TCP-based port to different Kubernetes Services based on the request content.

## Procedure

- 1.
- 2.
- 3.
- 4.
5. On the Create page, configure the basic information about the ingress gateway service.

 **Note** You can also click [Create from YAML](#) and define a custom ingress gateway service. For more information, see [Define a custom ingress gateway service](#).

Parameter	Description
Name	The name of the ingress gateway service.
Cluster	The cluster in which you want to deploy the ingress gateway service.
Gateway types	The type of the ingress gateway service. Valid values: North-South IngressGateway and North-South EgressGateway.
SLB Instance Type	The access type of the Server Load Balancer (SLB) instance. Valid values: <b>Internet Access</b> and <b>Private Access</b> .

Parameter	Description
Create SLB Instance or Use Existing SLB Instance	<p>The SLB instance that you want to use. You can select an SLB instance by using one of the following methods:</p> <ul style="list-style-type: none"> <li>◦ Use Existing SLB Instance: Select an existing SLB instance from the drop-down list.</li> <li>◦ Create SLB Instance: Click <b>Create SLB Instance</b> and select an SLB instance type from the drop-down list.</li> </ul> <div style="background-color: #e6f2ff; padding: 10px; margin-top: 10px;"> <p> <b>Note</b> We recommend that you assign a dedicated SLB instance to each Kubernetes Service in the cluster. If multiple Kubernetes Services share the same SLB instance, the following risks and limits exist:</p> <ul style="list-style-type: none"> <li>◦ If you assign a Kubernetes Service with an SLB instance that is used by another Kubernetes Service, the existing listeners of the SLB instance are forcibly overwritten. This may interrupt the original Kubernetes Service and make your application unavailable.</li> <li>◦ If you create an SLB instance when you create a Kubernetes Service, the SLB instance cannot be shared among Kubernetes Services. Only SLB instances that you create in the SLB console or by calling API operations can be shared.</li> <li>◦ Kubernetes Services that share the same SLB instance must use different frontend listening ports. Otherwise, port conflicts may occur.</li> <li>◦ If multiple Kubernetes Services share the same SLB instance, you must use the listener names and the vServer group names as unique identifiers in Kubernetes. Do not modify the names of listeners or vServer groups.</li> <li>◦ You cannot share an SLB instance across clusters or regions.</li> </ul> </div>

Parameter	Description
Port Mapping	<p>The port mappings. Click <b>Add Port</b>. In the row that appears, specify a service port.</p> <div style="background-color: #e1f5fe; padding: 5px;"><p> <b>Note</b> ASM provides four default ports that are commonly used by Istio. You can keep or remove the default ports or add ports as needed.</p></div>
Resources Limits	The CPU and memory specifications for the pod of the ingress gateway service.
Gateway instances	The number of replicas for the ingress gateway service.
Automatic create gateway rules	Specifies whether to automatically create a gateway that has the same name as the ingress gateway service.

6. (Optional) Click **Advanced Options** and set the parameters that are described in the following table as needed.

Parameter	Description
External Traffic Policy	<p>The policy to distribute external traffic. Valid values:</p> <ul style="list-style-type: none"><li>◦ <b>Local</b>: This policy routes traffic only to pods on the node where the ingress gateway service is deployed.</li><li>◦ <b>Cluster</b>: This policy can route traffic to pods on other nodes in the cluster.</li></ul>

Parameter	Description
HPA	<p>Select <b>HPA</b> and set the following parameters:</p> <div style="background-color: #e0f2f7; padding: 5px; border: 1px solid #ccc;"> <p> <b>Note</b> Only ASM Commercial Edition (Professional Edition) supports this feature.</p> </div> <ul style="list-style-type: none"> <li>◦ <b>metrics</b>: Set the <b>Monitoring items</b> and <b>Threshold</b> parameters. If the metric value exceeds the specified threshold, the number of replicas increases for the ingress gateway service. If the metric value is below the specified threshold, the number of replicas decreases for the ingress gateway service.</li> </ul> <p>If you specify thresholds for the CPU and memory specifications, both thresholds take effect. In this case, if the CPU utilization or memory usage exceeds or is below the specified threshold, the number of replicas is resized accordingly.</p> <ul style="list-style-type: none"> <li>◦ <b>Maximum replicas</b>: the maximum number of replicas that can be resized for the ingress gateway service.</li> <li>◦ <b>Minimum number of replicas</b>: the minimum number of replicas that can be resized for the ingress gateway service.</li> </ul>
Rolling Upgrade	<p>Select <b>Rolling Upgrade</b> and set the following parameters:</p> <ul style="list-style-type: none"> <li>◦ <b>Maximum number of unavailable instances</b>: the maximum number of unavailable replicas during a rolling update.</li> <li>◦ <b>Exceeding the desired number of instances</b>: the maximum number of replicas that exceeds the expected number of replicas during a rolling update. For example, if you set this parameter to 25%, the number of replicas during a rolling update cannot exceed 125% of the original number of replicas.</li> </ul>

Parameter	Description
TLS performance optimization	<p>Specifies whether to enable the Transport Layer Security (TLS) performance optimization feature. This feature speeds up TLS encryption and decryption.</p> <p>Select <b>TLS performance optimization</b> and select nodeAffinity labels to match the nodes with optimized performance based on the labels.</p> <div style="border: 1px solid #ccc; background-color: #e6f2ff; padding: 5px; margin-top: 10px;"> <p> <b>Note</b> Only ASM Commercial Edition (Professional Edition) supports this feature. You must also enable the Multi-Buffer for TLS acceleration feature.</p> </div>
SLB graceful offline	<p>After you select <b>SLB graceful offline</b>, the ingress gateway service is not affected if the SLB instance becomes unavailable.</p> <div style="border: 1px solid #ccc; background-color: #e6f2ff; padding: 5px; margin-top: 10px;"> <p> <b>Note</b> Only ASM Commercial Edition (Professional Edition) supports this feature.</p> </div>

7. Click **Create**.

## Result

After you deploy the ingress gateway service, you can view the details of the ingress gateway service in the ACK console.

- To view the basic information about the ingress gateway service, perform the following steps:
  - i.
  - ii. In the left-side navigation pane, click **Clusters**.
  - iii. On the **Clusters** page, find the cluster that you want to manage and click its name or click **Details** in the **Actions** column.
  - iv. In the left-side navigation pane of the details page, choose **Network > Services**.
  - v. In the upper part of the **Services** page, select **istio-system** from the **Namespace** drop-down list.
  - vi. Find the ingress gateway service that you want to view and click **Details** in the **Actions** column.
- To view the pod information about the ingress gateway service, perform the following steps:
  - i.
  - ii. In the left-side navigation pane, click **Clusters**.
  - iii. On the **Clusters** page, find the cluster that you want to manage and click its name or click **Details** in the **Actions** column.
  - iv. In the left-side navigation pane, choose **Workloads > Pods**.
  - v. In the upper part of the **Pods** page, select **istio-system** from the **Namespace** drop-down list.

- vi. Find the pod of the ingress gateway service and click **View Details** in the Actions column.

# 5. Deploy an application in an ASM instance

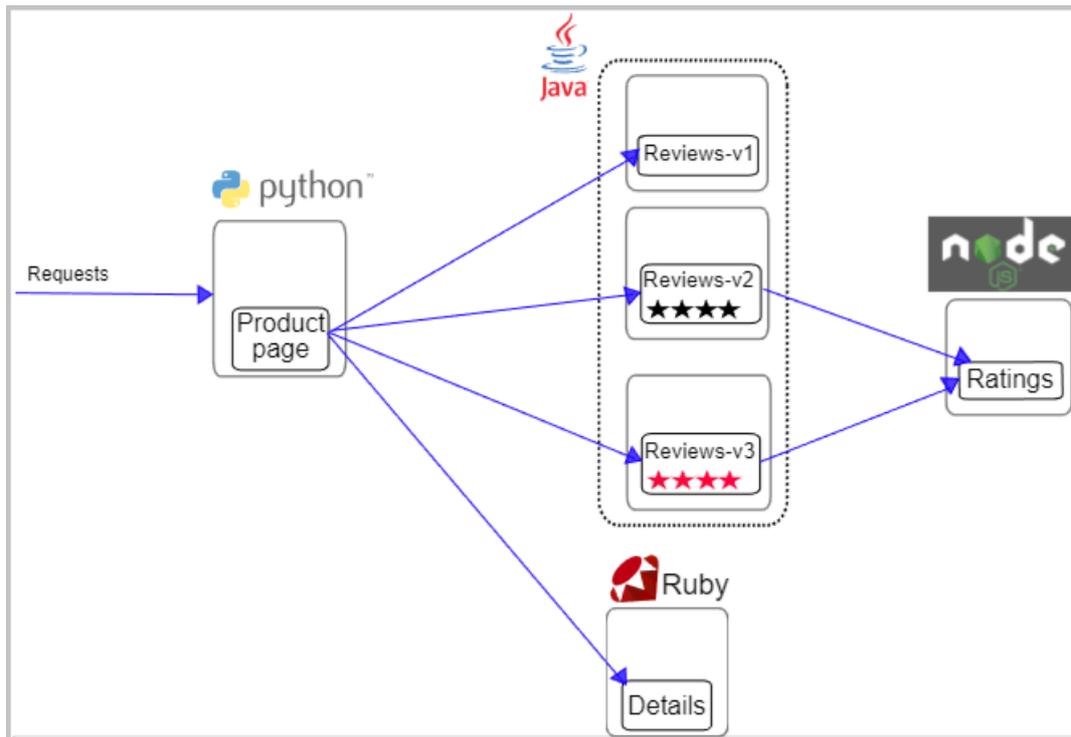
After you deploy an ingress gateway service in a cluster that is added to an Alibaba Cloud Service Mesh (ASM) instance, you can deploy applications in the ASM instance. This topic describes how to deploy an application in an ASM instance.

## Prerequisites

- An ASM instance is created, and a Container Service for Kubernetes (ACK) cluster is added to the ASM instance. For more information, see [Create an ASM instance](#) and [Add a cluster to an ASM instance](#).
- The kubectl client is connected to the ACK cluster that is added to the ASM instance. For more information, see [Connect to ACK clusters by using kubectl](#).
- An ingress gateway service is deployed in the ACK cluster that is added to the ASM instance. This way, after you deploy an application in the ACK cluster, the application can be accessed from the Internet. For more information, see [Deploy an ingress gateway service](#).

## Context

In this topic, a book review application that is named Bookinfo is used as an example. The following figure shows the microservices model of the application.



The Bookinfo application consists of the following microservices:

- Product page: generates pages by calling the Details and Reviews microservices.
- Details: contains the information about books.
- Reviews: contains book reviews and may call the Ratings microservice.
- Ratings: contains book ratings that are generated based on book reviews.

The Reviews microservice has the following versions:

- Version v1 does not call the Ratings microservice.
- Version v2 calls the Ratings microservice and displays each rating as one to five black stars.
- Version v3 calls the Ratings microservice and displays each rating as one to five red stars.

## Procedure

- 1.
- 2.
- 3.
4. In the left-side navigation pane of the details page, click **Namespaces and Quotas**.
5. On the **Namespace** page, click **Edit** in the **Actions** column of the **default** namespace.
6. In the **Edit Namespace** dialog box, create one or more tags for the namespace. In this example, perform the following steps to create a tag. Then, click **Add**.
  - i. Set **Variable Name** to *istio-injection*.
  - ii. Set **Variable Value** to *enabled*.

 **Note** Alternatively, you can run the following command on the kubectl client to tag a namespace:

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

7. Download the YAML file of the Bookinfo application from the [Istio repository of GitHub](#).
8. Run the following command on the kubectl client to deploy the Bookinfo application in the ACK cluster that is added to the ASM instance:

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

## Result

To view the deployment information about the Bookinfo application, perform the following steps:

- 1.
2. In the left-side navigation pane, click **Clusters**.
3. On the **Clusters** page, click the name of the cluster where the Bookinfo application is deployed. Alternatively, click **Details** in the **Actions** column of the cluster where the Bookinfo application is deployed.
4. In the left-side navigation pane of the details page, click **Pods**.
5. At the top of the **Pods** tab, select **default** from the **Namespace** drop-down list.

 **Note** Click **View Details** in the **Actions** column of the pod of the Bookinfo application.