

Getting Started with IBM Event Streams

Building an event-driven architecture with IBM Event Streams allows organizations to transition from traditional monolith systems and silos to more modern microservices and event streaming applications that increase their agility and accelerate their time to innovation.

IBM Event Streams builds on top of open-source Apache Kafka[®] to offer enterprise-grade event streaming capabilities. The following features are included as part of IBM Event Streams:

- Identity and Access Management (IAM), fine-grain security controls to manage the access that you want to grant each user for Kafka clusters, Topics, Consumer Groups, Producers and more.
- Geo-replication to deploy multiple instances of Event Streams in different locations and then synchronize data between your clusters to improve service availability.
- Visually driven management and monitoring experience with the Event Streams dashboard that displays metrics collected from the cluster, Kafka brokers, messages, consumers, and producers to provide health check information and options to resolve issues.
- Encrypted communication between internal components and encrypted storage.

In this tutorial, you will explore the following key capabilities:

- Prepare IBM Cloud Pak for Integration 2020.1.1 running on Red Hat OpenShift 4.3
- Install an IBM Event Streams 2019.4.2 instance in IBM Cloud Pak
- Create and manage Event Streams topics
- Use a Starter application to send and receive data

Task 1 - Preparing IBM Cloud Pak for Integration

Set up your IBM Cloud Pak for Integration environment before installing Event Streams

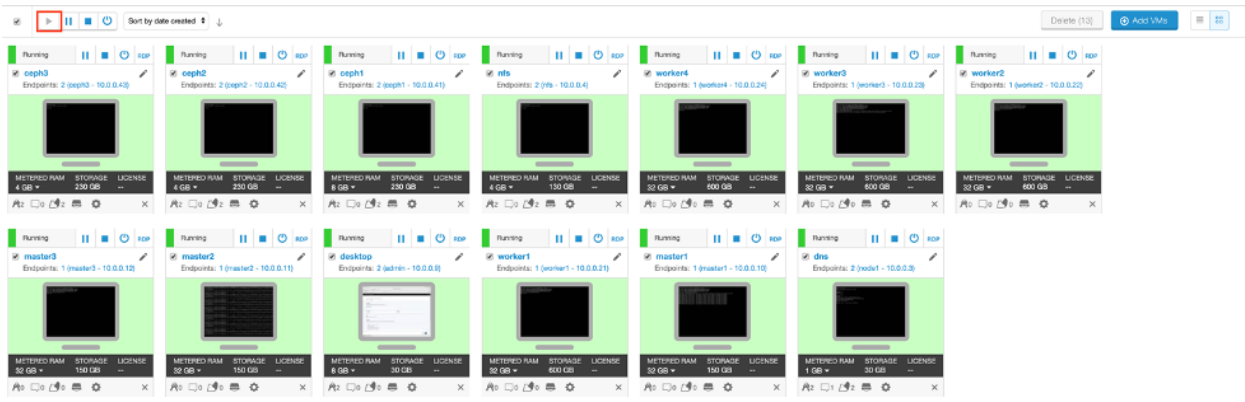
The demo runs on a virtual machine that is provided by IBM Demos.

To get access, click **reserve** link to create an instance in the **Before you**

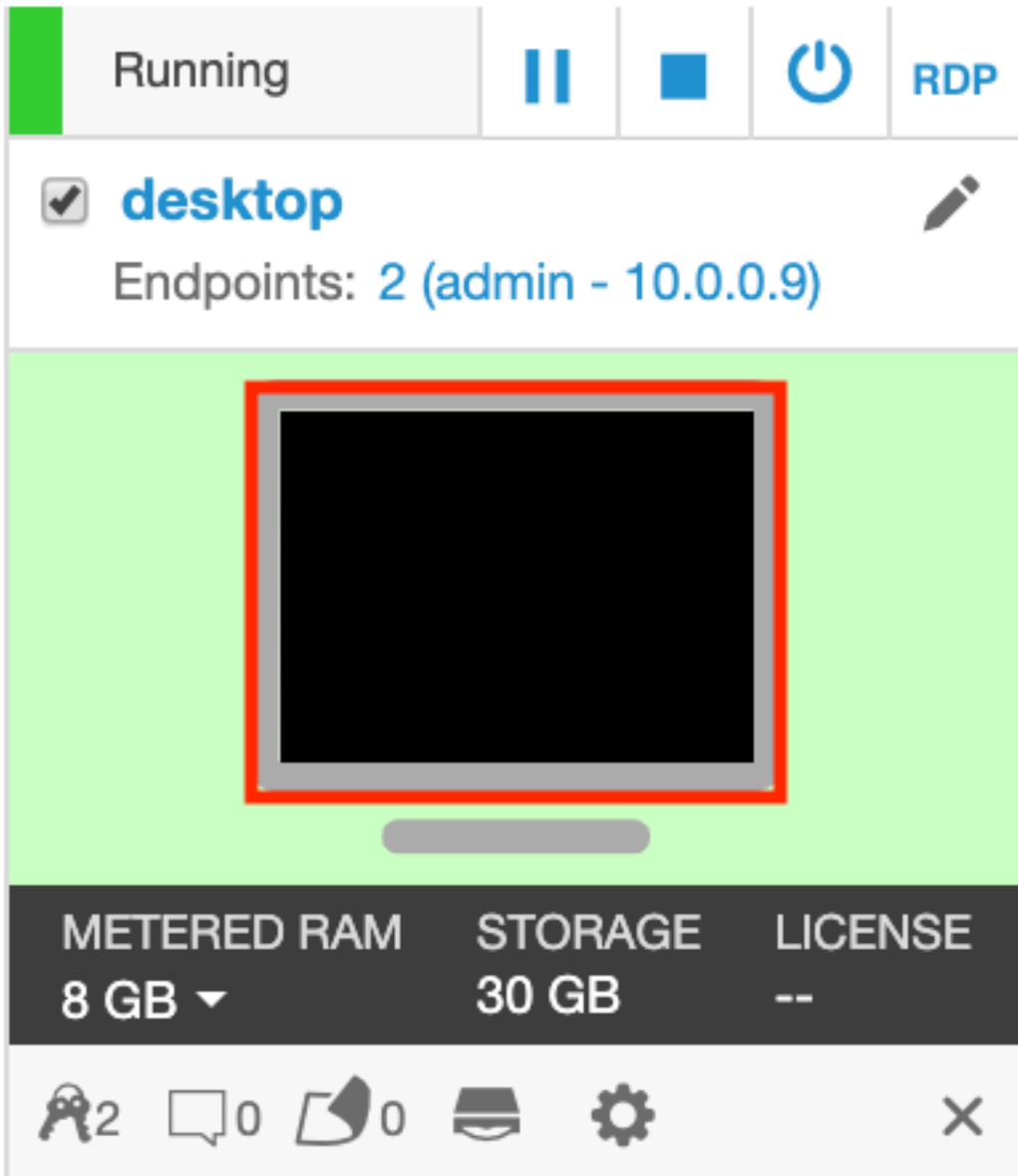
start section on this tutorial page. You'll then receive an email with the URL and password to access the virtual machine.

Navigate to the URL in the email, which opens the IBM Demonstration Portal. Enter the password also included in the email. The IBM Demonstration Portal presents several Linux virtual machines configured in an IBM Cloud Pak for Integration 2020.1.1 cluster on Red Hat OpenShift 4.3.

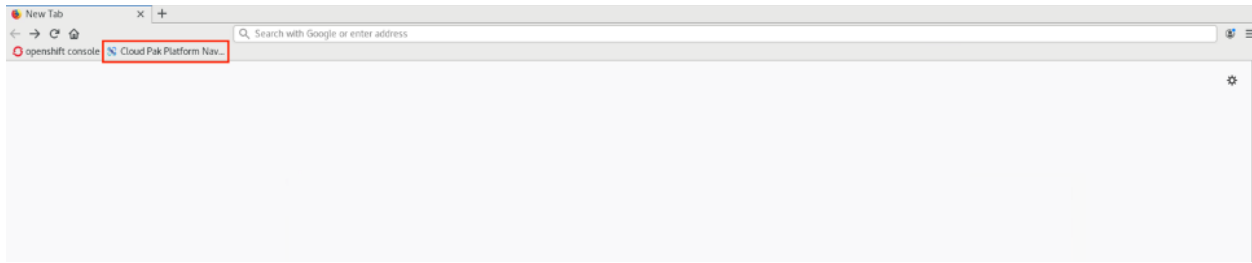
1. If needed, click the **run button** to start the virtual machines.



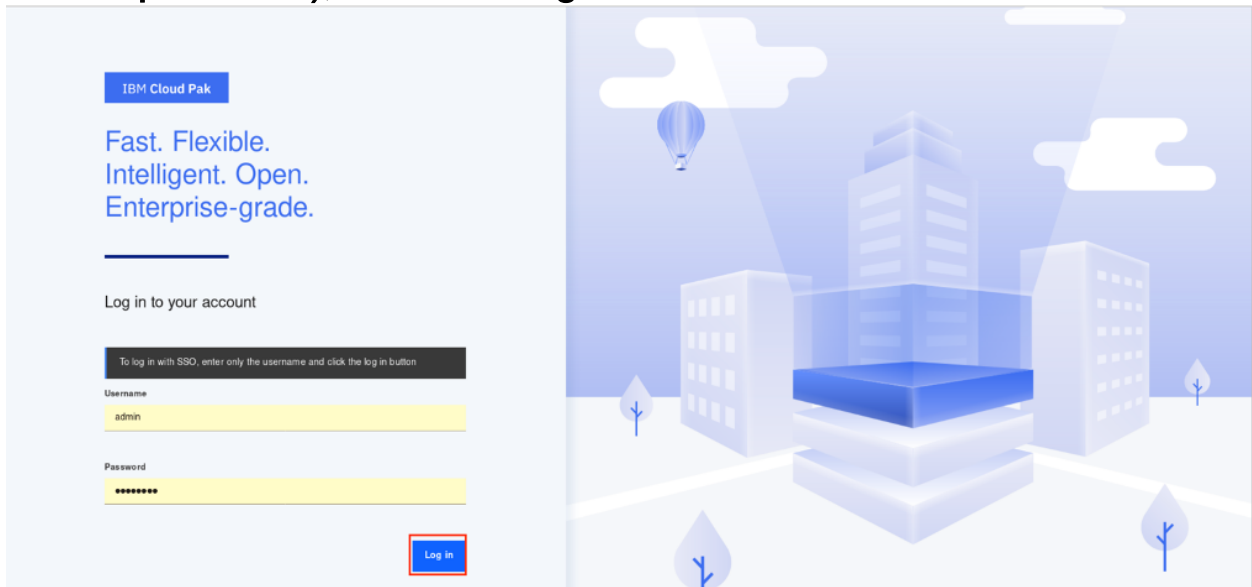
2. Once the virtual machines display **Running** as their status, click the **desktop node** image to launch the lab machine.



3. Log in to the Linux desktop with User ID **ibmuser** and Password **engageibm** .
4. Open a browser and navigate to IBM Cloud Pak for Integration by using the bookmark toolbar and select **Cloud Pak Platform Navigator**.
(Preferred browser: Firefox)



5. Log in to IBM Cloud Pak if a login screen is presented. You may not need enter the username and password (username **admin** and Password **passw0rd**), and click **Log in**.

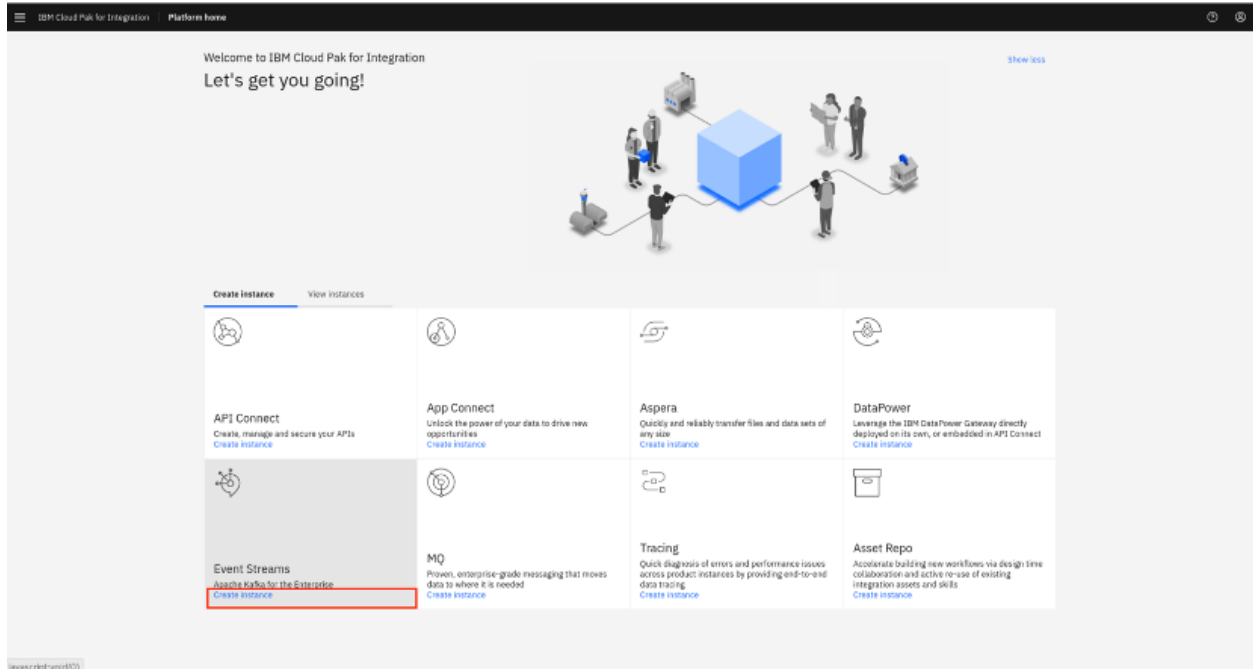


Task 2 - Installing an Event Streams instance

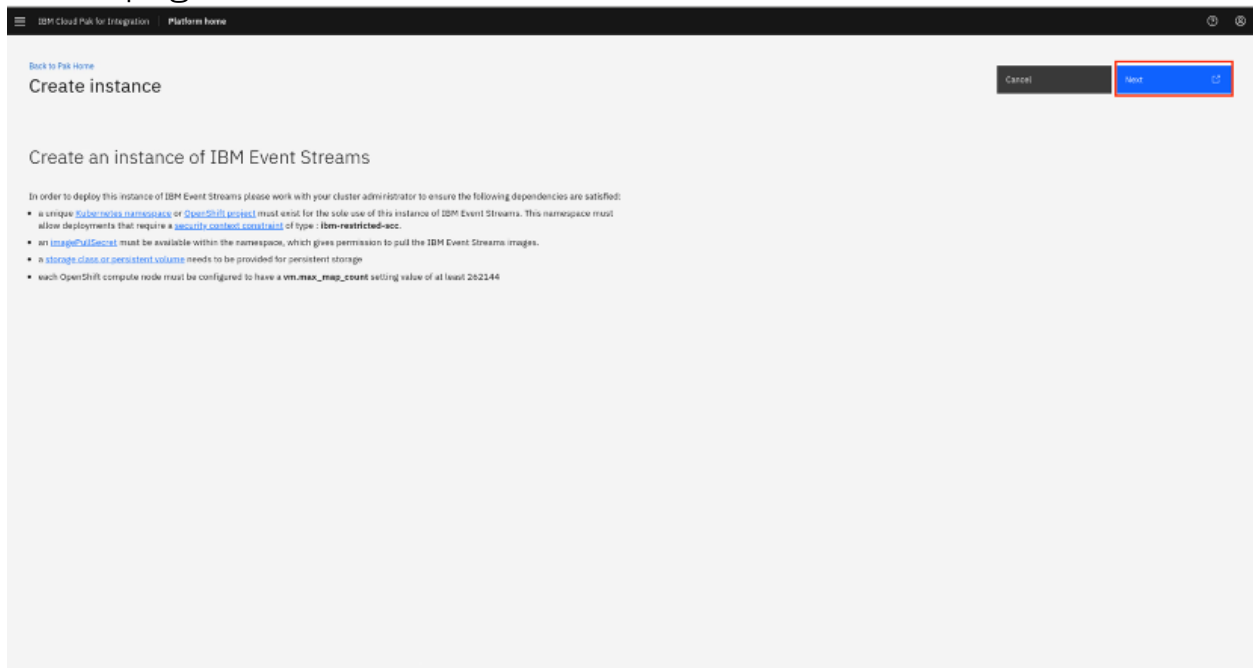
IBM Cloud Pak for Integration offers a single, unified platform for all your enterprise integration needs. It deploys integration capabilities into the Red Hat OpenShift managed container environment and uses the monitoring, logging, and security systems of OpenShift to ensure consistency across all integration solutions

Install a new instance of Event Streams in IBM Cloud Pak for Integration.

1. Using the virtual machine, click the bookmark for IBM Cloud Pak for Integration. Locate Event Streams and click **Create instance**.



- Click **Next**. Review the information provided about Event Streams on the overview page.



- Configure the Event Streams chart as follows. The helm chart creates a number of IBM Cloud Pak for Integration configuration objects that can be customized.

1. In the Helm release name, enter **eslab**.
2. As the Target namespace, enter **eventstreams**.
3. Select **local-cluster** as the Target cluster
4. Select the License agreement checkbox.

IBM Cloud Pak for Integration

ibm-eventstreams-icp4i-prod V 1.4.1

Overview Configuration

Configuration
IBM Event Streams based on Apache Kafka. Edit these parameters for configuration.

Helm release name *
eslab

Target namespace *
eventstreams

Target cluster *
local-cluster

License *
☒ I have read and agreed to the license agreement

Parameters
To install this chart, additional configuration is needed in Quick start. To customize installation, view and edit All parameters.

☒ Quick start
Required and recommended parameters to view and edit.

> All parameters
Other required, optional, and read-only parameters to view and edit.

Cancel Install

4. Expand the **Quick start** section.
1. Enter **integration** as the Namespace where the Platform Navigator is installed.
2. Enter the External hostname/IP address: **icp-proxy.apps.demo.ibmmdte.net**.

IBMCLOUD Pak for Integration

License *

☒ I have read and agreed to the License agreement

Parameters

To install this chart, additional configuration is needed in Quick start. To customize installation, view and edit All parameters.

☒ Quick start
Required and recommended parameters to view and edit.

IBM Cloud Pak for Integration
Configuration settings for IBM Cloud Pak for Integration

Namespace where the Platform Navigator is installed *

integration

External access settings
Configuration for network connections to IBM Event Streams

External hostname IP address *

icp-prmg.apps.demo.ibm.de.net

> All parameters
Other required, optional, and read-only parameters to view and edit.

Cancel Install

5. Expand the **All parameters** section.

1. Check that the **Used as an IBM Supporting Program** checkbox.

2. Enter the Image pull secret: **ibm-entitlement-key**

IBMCLOUD Pak for Integration

< All parameters
Other required, optional, and read-only parameters to view and edit.

Global install settings
Values that apply to all components of IBM Event Streams

☐ Used in production *

☒ Used as an IBM Supporting Program *

Docker image registry *

cp.icr.io/cp/icp4i/es

Image pull secret

ibm-entitlement-key

Image pull policy *

IfNotPresent

File system group ID

Enter value

Architecture *

amd64 platforms

Pod to pod encryption *

Disabled

Kubernetes internal DNS domain name *

cluster.local

Number of zones *

1

Zone Labels *

my-zone-label

Cancel Install

6. For this lab, scroll and Uncheck **Enable message Indexing** and then click **Install** .

The installation process takes a few minutes to complete. A notification at the top of the page informs you that **Chart deployment is in progress**.

Note: For this lab, Keep as default the rest of parameters.

Private key
Enter value

Public certificate
Enter value

CA certificate
Enter value

Message indexing settings
Configuration for message indexing used to enhance browsing the messages on topics

☒ Enable message indexing **1**

CPU request for Elastic Search nodes *
500m

Memory request for Elastic Search nodes *
2Gi

CPU limit for Elastic Search nodes *
1000m

Memory limits for Elastic Search nodes *
4Gi

Geo-replication settings
Configuration for geo-replicating topics between clusters

Geo-replicator workers *
0

Cancel Install

The installation process takes a few minutes to complete. A notification at the top of the page informs you that **Chart deployment is in progress**.

7. To continue to the Event Streams interface, scroll to the top of the page and click **View all** to leave the configuration page.

View All

ibm-eventstreams-icp4i-prod V 1.4.1

Overview Configuration

Chart deployment is in progress and may take a few minutes. Go to the Helm Releases page to check on the status of your deployment.

Configuration
IBM Event Streams based on Apache Kafka. Edit these parameters for configuration.

Helm release name *
eslab

Target namespace *
eventstreams

Target cluster *
local-cluster

License *
☒ I have read and agreed to the License agreement

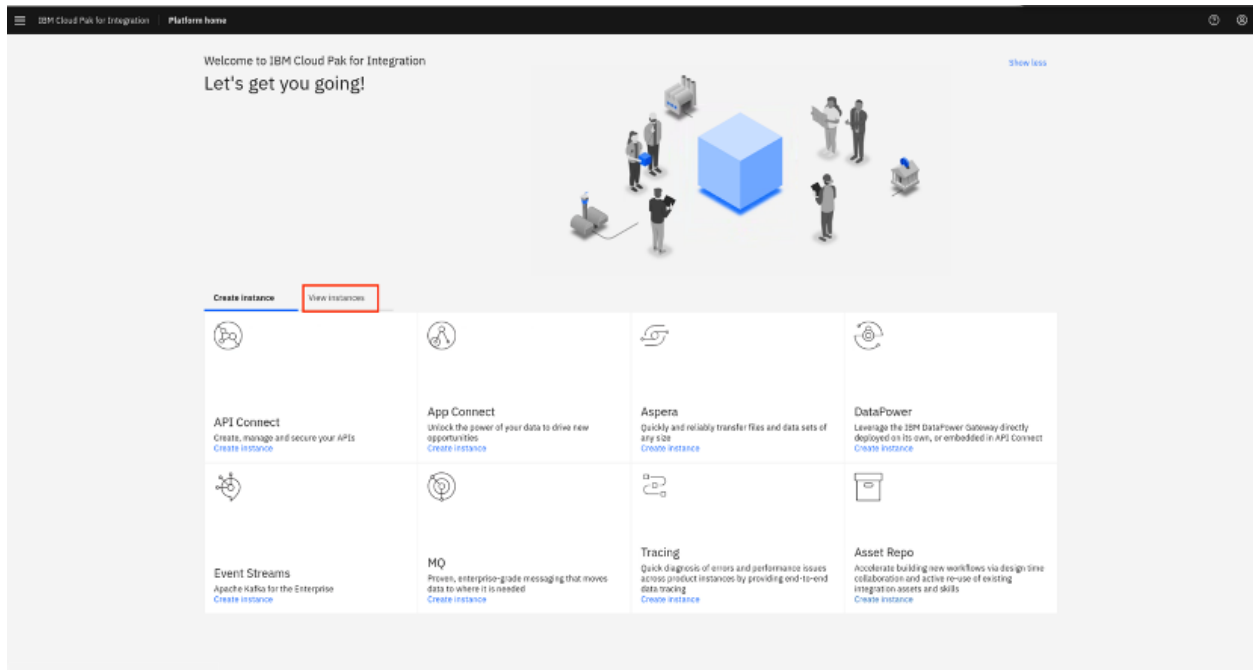
Parameters
To install this chart, additional configuration is needed in Quick start. To customize installation, view and edit All parameters.

Quick start
Required and recommended parameters to view and edit.

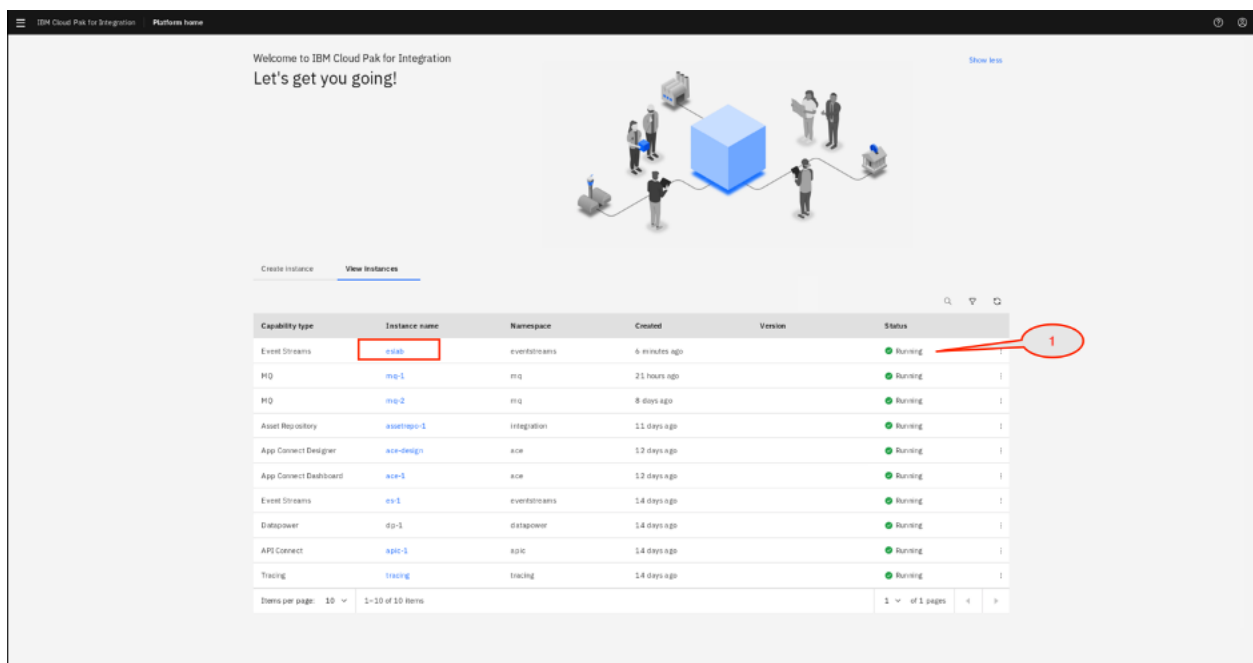
All parameters
Other required, optional, and read-only parameters to view and edit.

Cancel Install

8. Click **View Instances**. All installed instances are displayed.



9. Verify if Event Streams instance **eslab** is running. Click instance name: **eslab**.



Note : You might receive a pop-up window appears with the message **Your connection is not private**, click **Advanced** .



Your connection is not private

Attackers might be trying to steal your information from **eslab-ibm-es-ui-route-eventstreams.apps.demo.ibmde.net** (for example, passwords, messages, or credit cards). [Learn more](#)

NET::ERR_CERT_AUTHORITY_INVALID

☐ Help improve Chrome security by sending URLs of some pages you visit, limited system information, and some page content to Google. [Privacy policy](#)

Advanced

Back to safety

In the second.popup-window. Scroll down and click **Proceed to eslab-ibm-es-ui-route-eventstreams.apps.demo.ibmde.net (unsafe)** link.



Your connection is not private

Attackers might be trying to steal your information from **eslab-ibm-es-ui-route-eventstreams.apps.demo.ibmde.net** (for example, passwords, messages, or credit cards). [Learn more](#)

NET::ERR_CERT_AUTHORITY_INVALID

☐ Help improve Chrome security by sending URLs of some pages you visit, limited system information, and some page content to Google. [Privacy policy](#)

Hide advanced

Back to safety


This server could not prove that it is **eslab-ibm-es-ui-route-eventstreams.apps.demo.ibmde.net**; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.


[Proceed to eslab-ibm-es-ui-route-eventstreams.apps.demo.ibmde.net \(unsafe\)](#)

10. Use the **System is healthy** box to verify the health of each Event Streams component.


IBM Cloud Pak for IntegrationEvent Streamseventstreams | eu4d


Welcome to IBM Event Streams
Let's get you started...







Send and receive messages with a sample application
Download and install our starter Kafka application and view data flowing to and from IBM Event Streams in just a few minutes







Create a topic
Topics are a named stream of messages. You can create a topic using the UI.







Documentation
View product documentation, as well as FAQs and tutorials.






Connect to this cluster
Get connection details and sample code to connect your applications.







Kafka basics
Learn the basics of Apache Kafka, the heart of IBM Event Streams, in 5 steps.



Connector basics
Learn about Kafka Connect, streaming to and from Event Streams, in 4 steps.



Schema basics
Learn about how IBM Event Streams manages schemas in 6 steps.



Find more in the Toolbox
Find more assets, applications, and guidance in the Toolbox.

System is healthy

93

System is healthy

5/5 components are online.

×

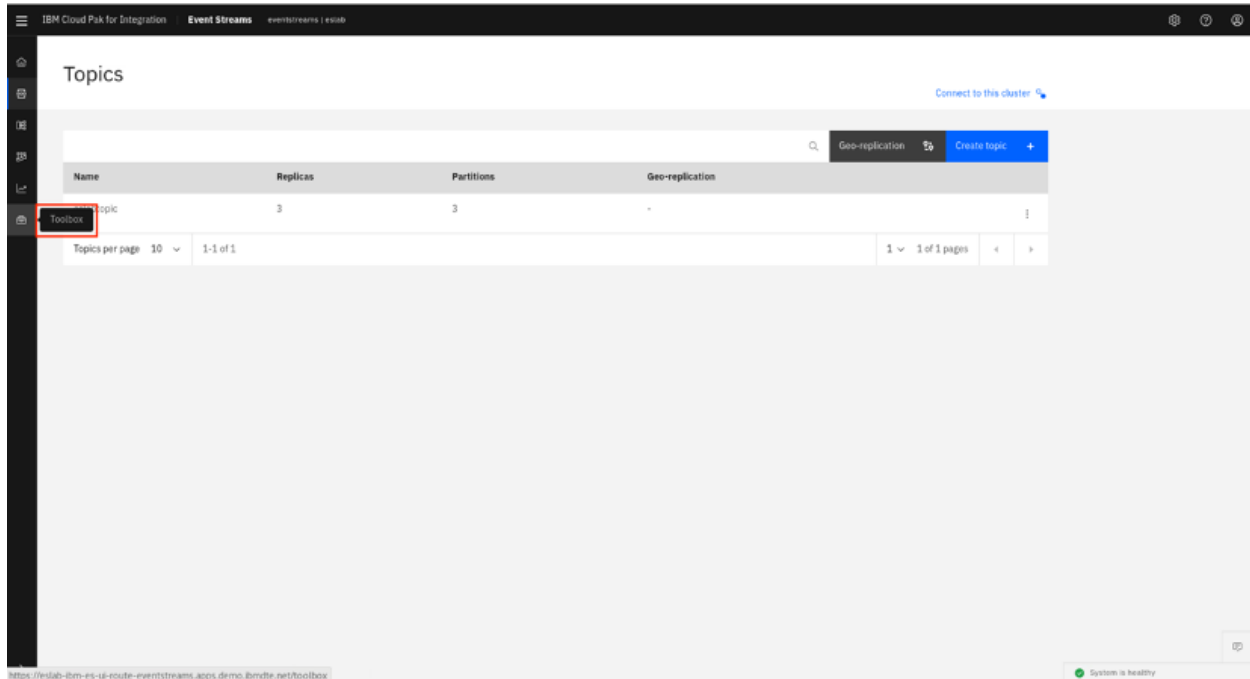
<div>UI server</div> <div>Pod 0 is running </div>	<div>Kafka brokers</div> <div>Pod 0 is running </div> <div>Pod 1 is running </div> <div>Pod 2 is running </div>
<div>ZooKeeper servers</div> <div>Pod 0 is running </div> <div>Pod 1 is running </div> <div>Pod 2 is running </div>	<div>Administration server</div> <div>Pod 0 is running </div>
<div>External access server</div> <div>Pod 0 is running </div> <div>Pod 1 is running </div>	<div>Geo-replication workers</div> <div>There are no geo-replication worker pods. </div>

11. You've installed IBM Event Streams on IBM Cloud Pak for Integration. In the next section, learn how to manage topics, the core of Event Streams functions. While you're at the **Getting started** page, take a moment to review **Kafka Basics**, some of the in-product education.

Task 3 – Creating and managing Event Streams topic

Applications connect to Event Streams topics and write to and read from them. Topics are known groupings of related data. Topics are created and configured by the Event Streams administrator.

1. In the Event Streams interface, click **Create topic**.



2. Enter **eslabtopic** as the topic name and click **Next**.

Note: This lab is preconfigured to connect to that specific topic. You can view the full range of configuration options by setting the **Show all available options** to on. However, this tutorial only focuses on the core set.

IBM Cloud Pak for Integration | Event Streams | eventstreams | esaletr

Topics / Create topic

Create topic

Show all available options

Off

Topic name Partitions Message Retention Replicas

Topic name

esaletripsoid 1

This is the unique name used to recognize your topic. It will also be used by your producers and consumers as part of the connection information, so make it something easy to recognize.

Cancel Next

System is healthy

3. Set three partitions and click **Next**.

IBM Cloud Pak for Integration | Event Streams | eventstreams | esaletr

Topics / Create topic

Create topic

Show all available options

Off

Topic name Partitions Message Retention Replicas

Partitions

3 1

One or more partitions make up a topic. A partition is an ordered list of messages. Partitions are distributed across the brokers in order to increase the scalability of your topic. You can also use them to distribute messages across the members of a consumer group.

Back Next

System is healthy

4. Define the message retention time. Set it to 10 minutes for this lab. Click **Next**.

IBM Cloud Pak for Integration | Event Streams | eventstreams | create

Topics / Create topic

Create topic

Show all available options

Off

Topic name | Partitions | **Message Retention** | Replicas

Message Retention

This is how long messages are retained before they are deleted.
If your messages are not read by a consumer within this time, they will be missed.

☐ A day
☐ A week
☐ A month
☒ 10 Minute(s) **1**

Back Next

System is healthy

- Define the number of replicas for your topic. Select the default setting of **Replication factor: 3** and **Minimum in-sync replicas: 2**.

IBM Cloud Pak for Integration | Event Streams | eventstreams | create

Topics / Create topic

Create topic

Show all available options

Off

Topic name | Partitions | Message Retention | **Replicas**

Replicas

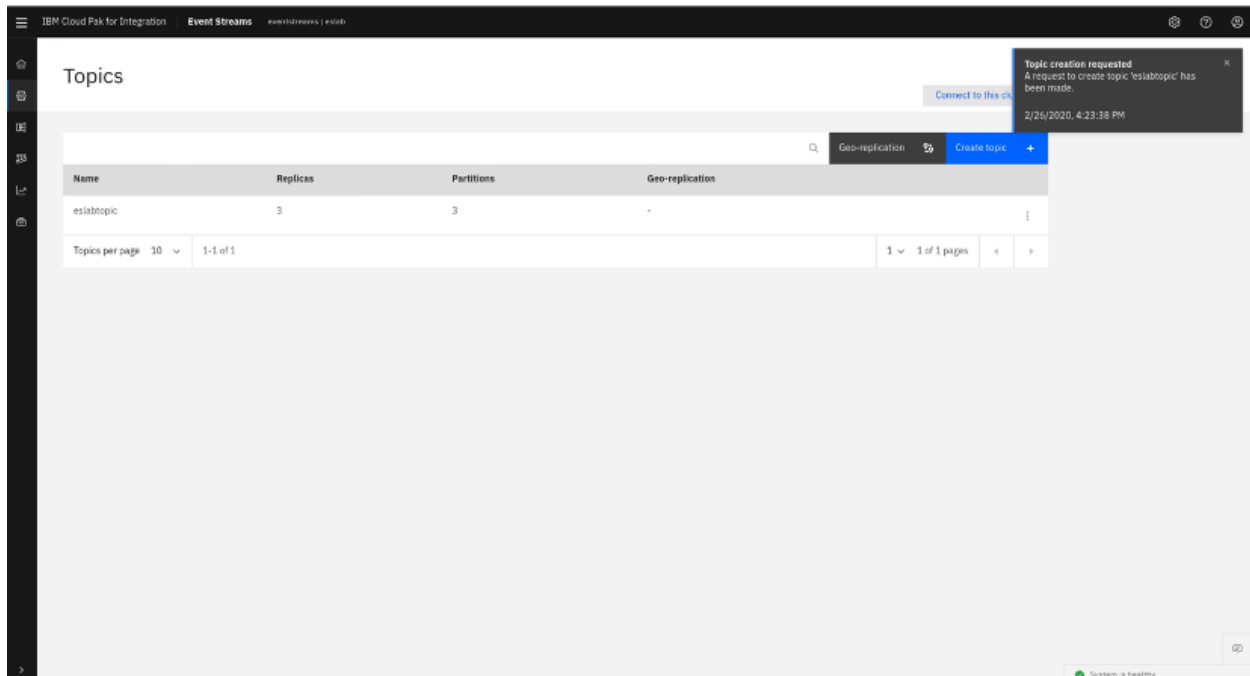
This is how many copies of a topic will be made for high availability.
The partitions of each topic can be replicated across a configurable number of brokers.

☐ Replication factor: 1
Minimum in-sync replicas: 1
☒ **Replication factor: 3**
Minimum in-sync replicas: 2
☐ Replication factor:
3
Minimum in-sync replicas:
2

Back Create topic

System is healthy

- Click **Create topic**. The Topics page is displayed. Your new topic is displayed along with a completion notification. You can now connect the starter application to Event Streams .

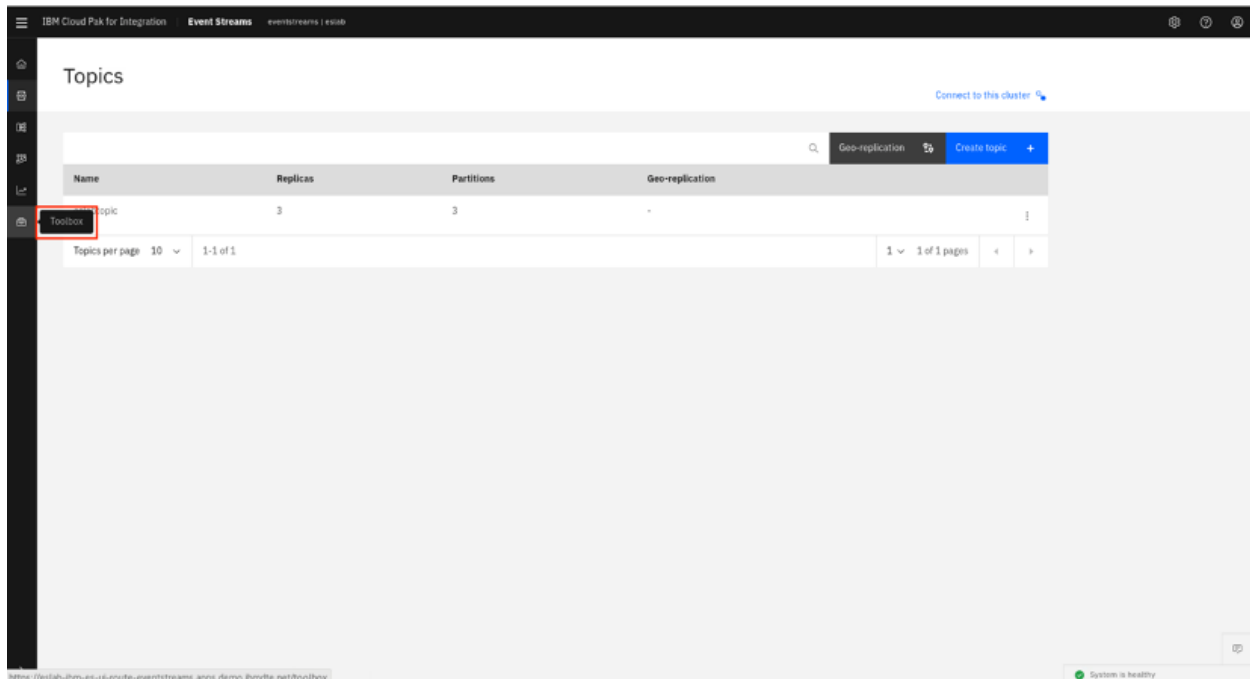


Task 4 - Use a Starter application to send and receive data

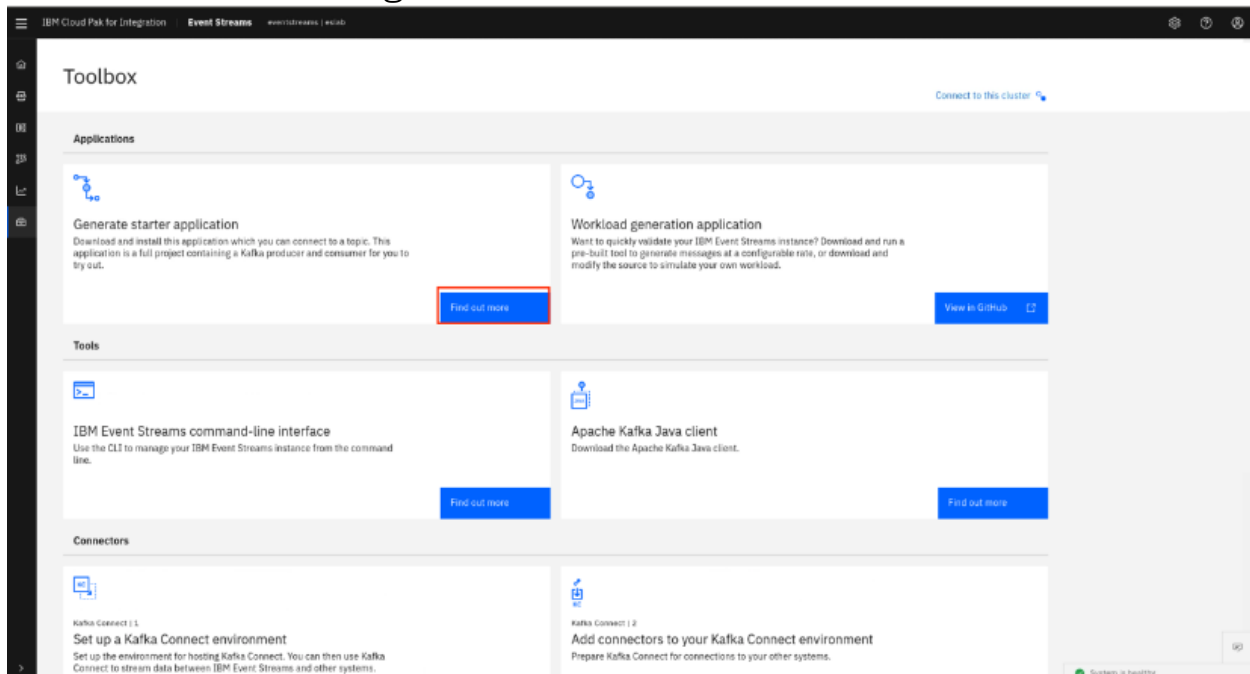
The final task in this tutorial shows you how to generate and run a starter application. Using the starter application, you can see how producing and consuming applications connect to a topic and send messages (a message is a unit of data in Kafka). Data sent by the producer can be viewed in the topic in Event Streams. You can then view the same data in the consuming application.

Event Streams includes several tools that can be used to test Event Streams and help with the development of Event Streams-based applications.

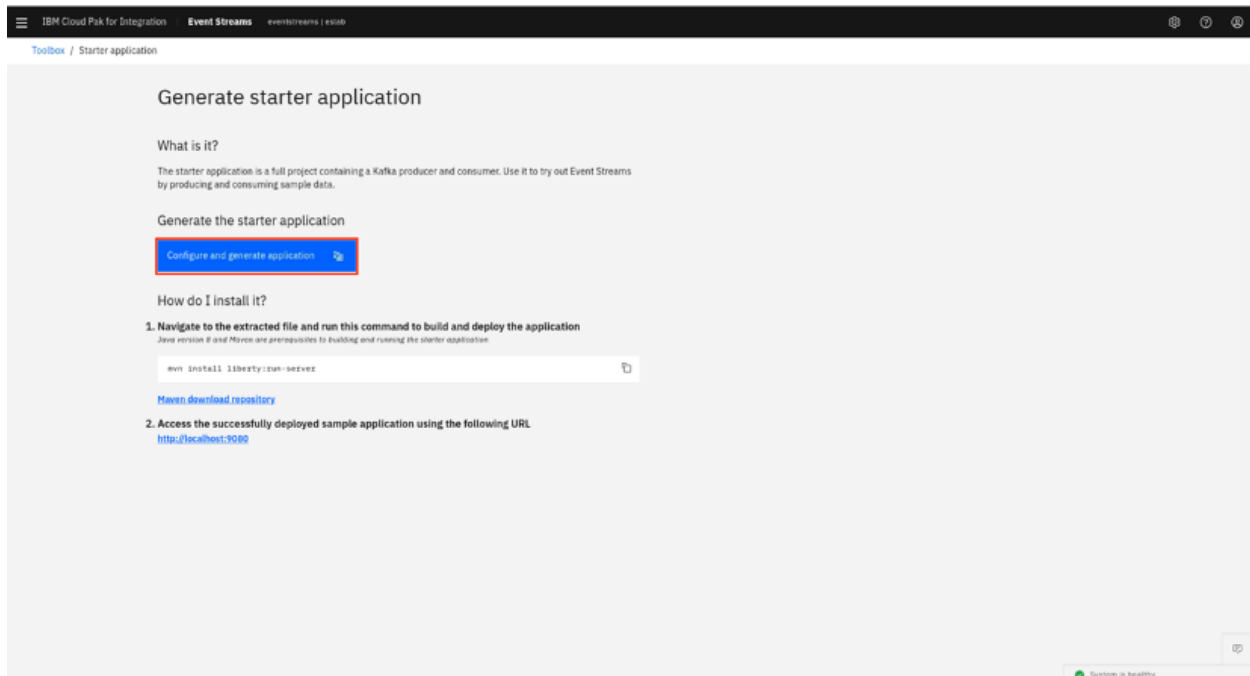
1. Click **Toolbox** in the primary navigation on the left.



- Go to the **Generate starter application** section and click **Find out more**. The **Generate starter application** page is displayed where you can configure and generate an application, run a liberty profile server, and send and receive messages (data).

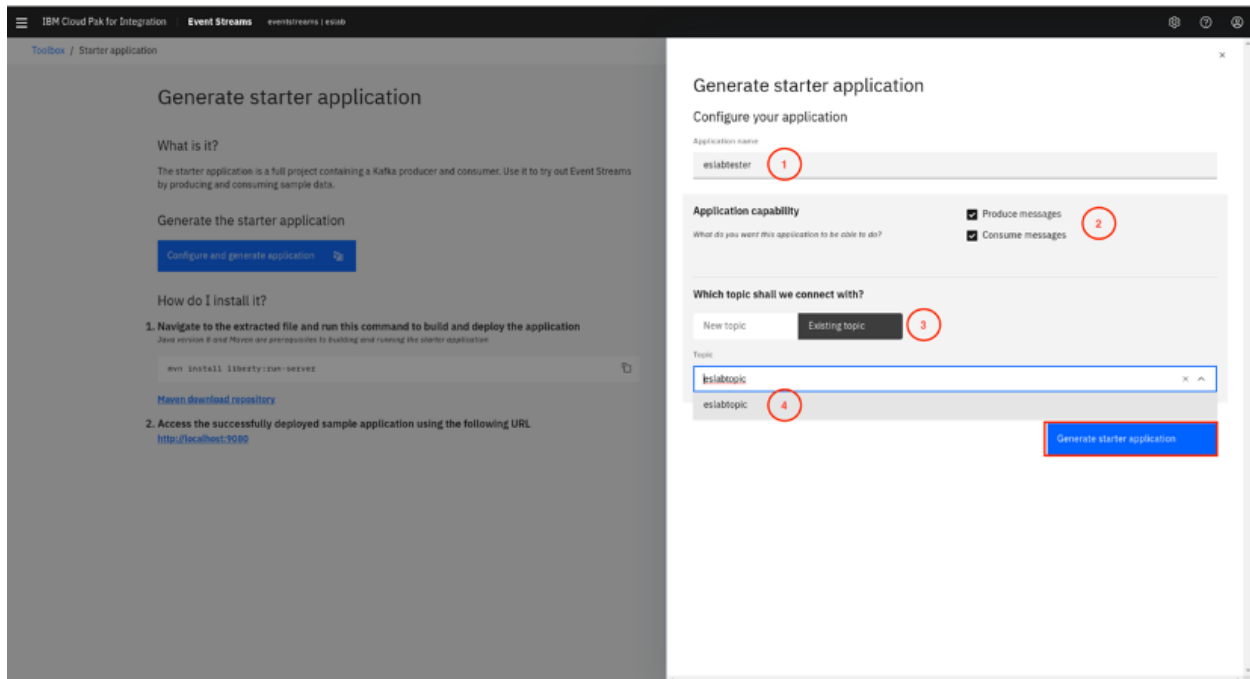


- Click **Configure and generate application** to open the configuration panel for the starter application.

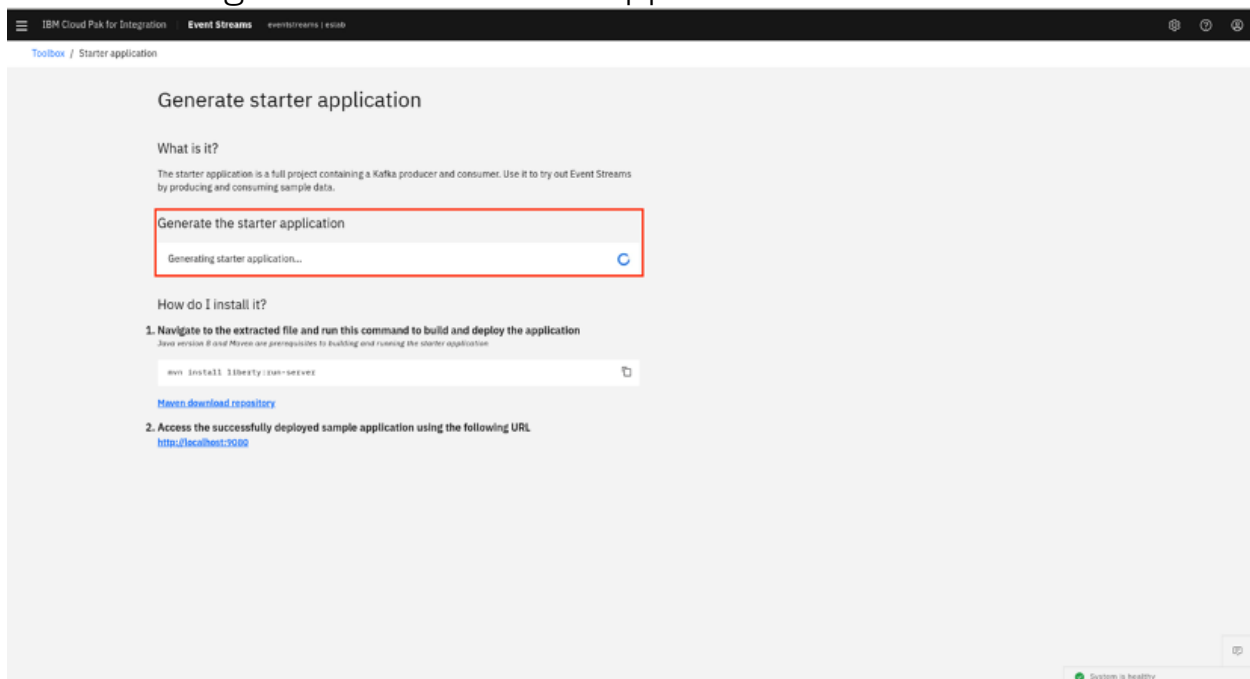


4. Configure the application as follows:

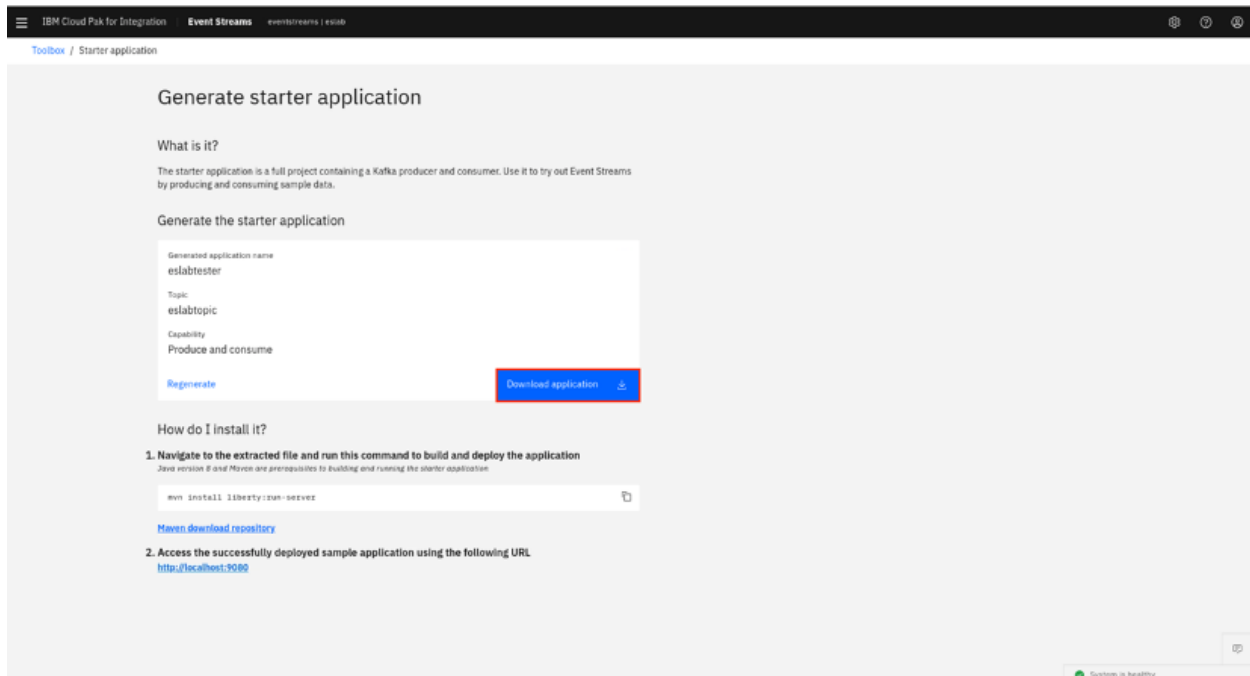
1. Enter the application name: **eslabtester**.
2. Ensure both **Produce message** and **Consume messages** are selected.
3. Select **Existing topic**.
4. Select **eslabtopic**.
5. Click **Generate starter application**.



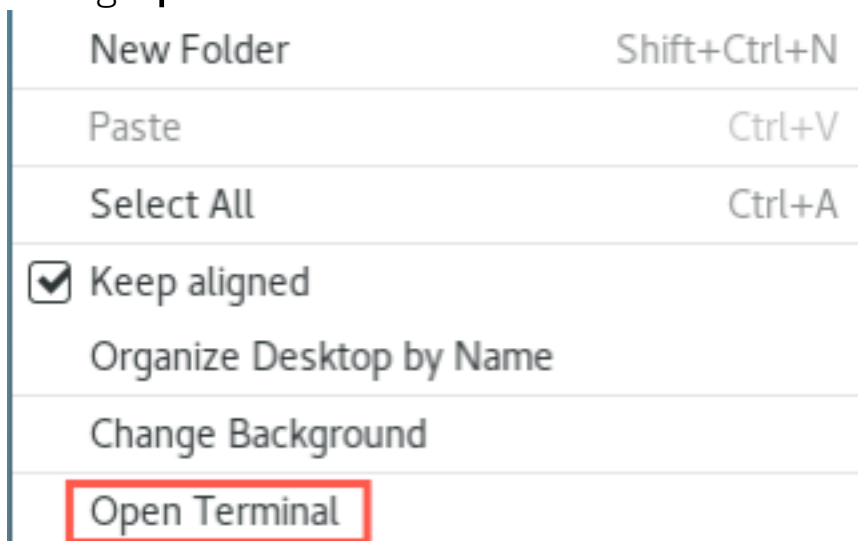
5. Event Streams generates the starter application.



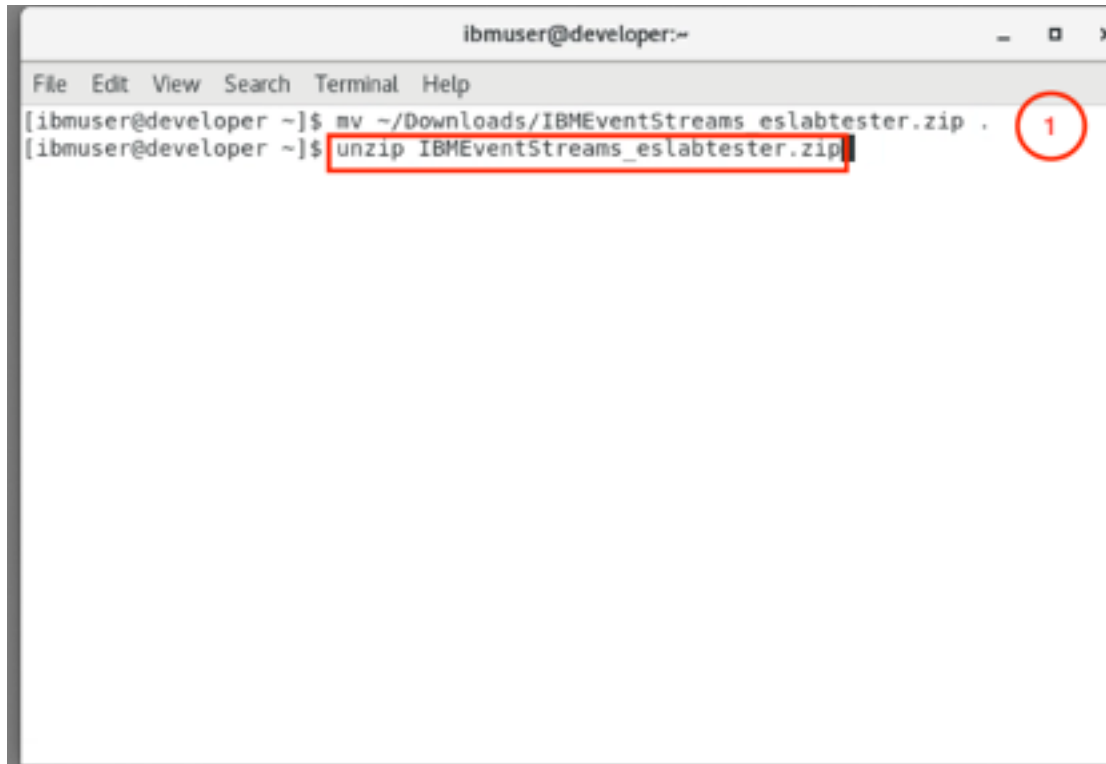
6. Click **Download application** to download the Starter application. In the popup window, check the **Save file** radio button and click **OK**. (this tutorial uses the **Downloads** directory).



7. Open a terminal window by right clicking on the desktop and selecting **Open Terminal**

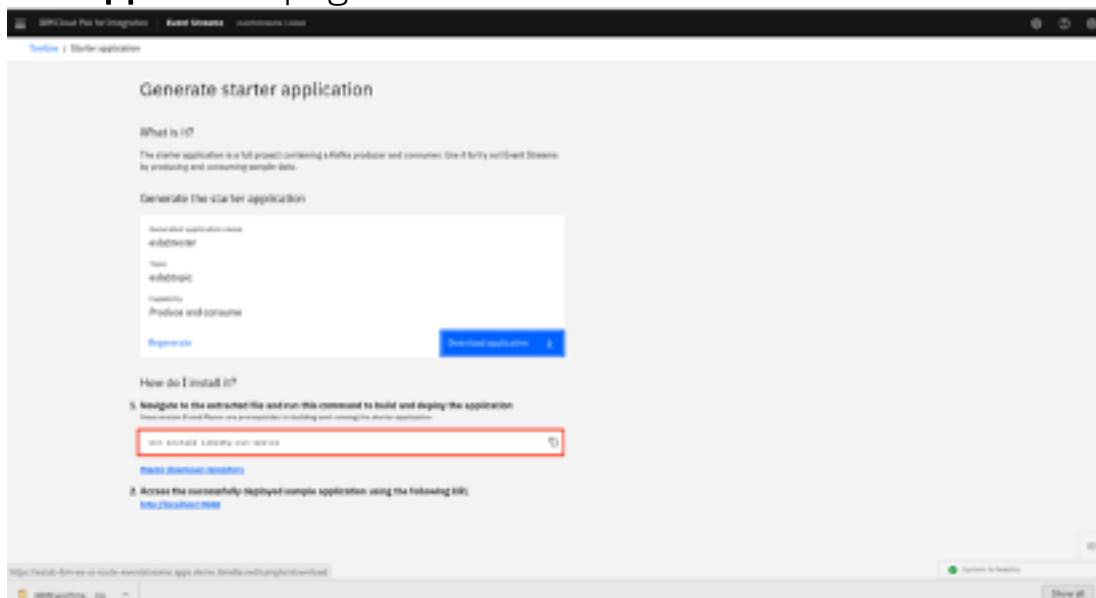


8. Move the **IBMEventStreams_eslabtester.zip** file to **home/ibmuser/** . Then, extract the file: **unzip IBMEventStreams_eslabtester.zip**.



```
ibmuser@developer:~  
File Edit View Search Terminal Help  
[ibmuser@developer ~]$ mv ~/Downloads/IBMEventStreams eslabtester.zip .  
[ibmuser@developer ~]$ unzip IBMEventStreams_eslabtester.zip
```

9. Click **Copy** icon **mvn install liberty:run-server** command from **Generate starter application** page.



10. **Paste** and execute the maven command to run the starter application .

```
ibmuser@developer:~  
File Edit View Search Terminal Help  
inflating: src/main/webapp/fonts/IBMPlexSans-Regular-Latin2.woff2  
inflating: src/main/webapp/fonts/IBMPlexSans-Regular-Latin3.woff  
inflating: src/main/webapp/fonts/IBMPlexSans-Regular-Latin3.woff2  
inflating: src/main/webapp/fonts/IBMPlexSans-Regular-Pi.woff  
inflating: src/main/webapp/fonts/IBMPlexSans-Regular-Pi.woff2  
inflating: src/main/webapp/fonts/IBMPlexSans-SemiBold-Latin1.woff  
inflating: src/main/webapp/fonts/IBMPlexSans-SemiBold-Latin1.woff2  
inflating: src/main/webapp/fonts/IBMPlexSans-SemiBold-Latin2.woff  
inflating: src/main/webapp/fonts/IBMPlexSans-SemiBold-Latin2.woff2  
inflating: src/main/webapp/fonts/IBMPlexSans-SemiBold-Latin3.woff  
inflating: src/main/webapp/fonts/IBMPlexSans-SemiBold-Latin3.woff2  
inflating: src/main/webapp/fonts/IBMPlexSans-SemiBold-Pi.woff  
inflating: src/main/webapp/fonts/IBMPlexSans-SemiBold-Pi.woff2  
inflating: src/test/java/it/HealthEndpointIT.java  
inflating: src/main/java/application/demo/DemoConsumeSocket.java  
inflating: src/main/java/application/demo/DemoConsumedMessage.java  
inflating: src/main/java/application/demo/DemoMessageEncoder.java  
inflating: src/main/java/application/demo/DemoProduceSocket.java  
inflating: src/main/java/application/demo/RecordData.java  
inflating: src/main/java/application/demo/RecordDataEncoder.java  
inflating: src/main/java/application/kafka/Consumer.java  
inflating: src/main/java/application/kafka/Producer.java  
inflating: src/main/liberty/config/resources/security/certs.jks  
[ibmuser@developer ~]$ mvn install liberty:run-server
```

When the message **The server defaultServer is ready to run a smarter planet** is displayed, the application is ready and running.

```
ibmuser@developer:~  
File Edit View Search Terminal Help  
1.8.0_242-b08 (en US)  
[INFO] [AUDIT ] CWWKE0001I: The server defaultServer has been launched.  
[INFO] [AUDIT ] CWWKE0100I: This product is licensed for development, and limited production use. The full license terms can be viewed here: https://public.dhe.ibm.com/ibmdl/export/pub/software/websphere/wasdev/license/base_ilan/ilan/19.0.0.7/lafiles/en.html  
[INFO] [AUDIT ] CWWKZ0058I: Monitoring dropsins for applications.  
[INFO] [WARNING ] SRVE9967W: The manifest class path jaxb-api.jar can not be found in jar file file:/home/ibmuser/target/liberty/wlp/usr/servers/defaultServer/apps/expanded/eslabtester.war/WEB-INF/lib/jaxb-core-2.2.11.jar or its parent.  
[INFO] [WARNING ] SRVE9967W: The manifest class path jaxb-core.jar can not be found in jar file file:/home/ibmuser/target/liberty/wlp/usr/servers/defaultServer/apps/expanded/eslabtester.war/WEB-INF/lib/jaxb-impl-2.2.11.jar or its parent.  
[INFO] [AUDIT ] CWWKT0016I: Web application available (default host): http://developer.demo.ibmdev.net:9080/ibm/api/  
[INFO] [AUDIT ] CWWKT0016I: Web application available (default host): http://developer.demo.ibmdev.net:9080/health/  
[INFO] [AUDIT ] CWWKT0016I: Web application available (default host): http://developer.demo.ibmdev.net:9080/jwt/  
[INFO] [AUDIT ] CWWKT0016I: Web application available (default host): http://developer.demo.ibmdev.net:9080/metrics/  
[INFO] [WARNING ] SRVE9967W: The manifest class path jaxb-api.jar can not be found in jar file file:/home/ibmuser/target/liberty/wlp/usr/servers/defaultServer/apps/expanded/eslabtester.war/WEB-INF/lib/jaxb-core-2.2.11.jar or its parent.  
[INFO] [WARNING ] SRVE9967W: The manifest class path jaxb-core.jar can not be found in jar file file:/home/ibmuser/target/liberty/wlp/usr/servers/defaultServer/apps/expanded/eslabtester.war/WEB-INF/lib/jaxb-impl-2.2.11.jar or its parent.  
[INFO] [AUDIT ] CWWKT0016I: Web application available (default host): http://developer.demo.ibmdev.net:9080/  
[INFO] [AUDIT ] CWWKZ0001I: Application eslabtester started in 1.834 seconds.  
[INFO] [AUDIT ] CWWKF0012I: The server installed the following features: [appSecurity-2.0, cdi-1.2, concurrent-1.0, distributedMap-1.0, jaxrs-2.0, jaxrsClient-2.0, jndi-1.0, json-1.0, jsonp-1.0, jwt-1.0, microProfile-1.2, mpConfig-1.1, mpFaultTolerance-1.0, mpHealth-1.0, mpJwt-1.0, mpMetrics-1.0, servlet-3.1, ssl-1.0, websocket-1.1]  
[INFO] [AUDIT ] CWWKF0011I: The defaultServer server is ready to run a smarter planet. The defaultServer server started in 4.930 seconds
```

11. Open the starter application by using <http://localhost:9080> (the link is also available on the **Generate starter application** page). This page represents the producing application on the left of the screen and the consuming application on the right.

IBM Event Streams

Starter Application

How does this work?
We've created this starter application in order to give you a starting point to produce and consume messages to IBM Event Streams. Start the producer and see the consumed messages appear.

30
messages have been produced
topic: eslabtopic

Custom payload string (optional)
testing a topic

Show 5 most recent message(s)

30
messages have been consumed
topic: eslabtopic

Showing 30 most recent message(s)

Message	Partition	Offset
Message 30	1	9
Message 29	2	9
Message 28	0	9
Message 27	1	8
Message 26	2	8
Message 25	0	8
Message 24	1	7
Message 23	2	7
Message 22	0	7

Partition 0 Offset 9

Message size 15 B

Kafka timestamp 4/15/2020, 9:33:44 AM

Key -

Raw payload

testing a topic

- Return to the **Generate starter application** page and click **Toolbox**.

IBM Cloud Pak for Integration Event Streams eventstreams / eslab

Toolbox Starter application

Generate starter application

What is it?
The starter application is a full project containing a Kafka producer and consumer. Use it to try out Event Streams by producing and consuming sample data.

Generate the starter application

Generated application name
eslabtester

Topic
eslabtopic

Capability
Produce and consume

Regenerate

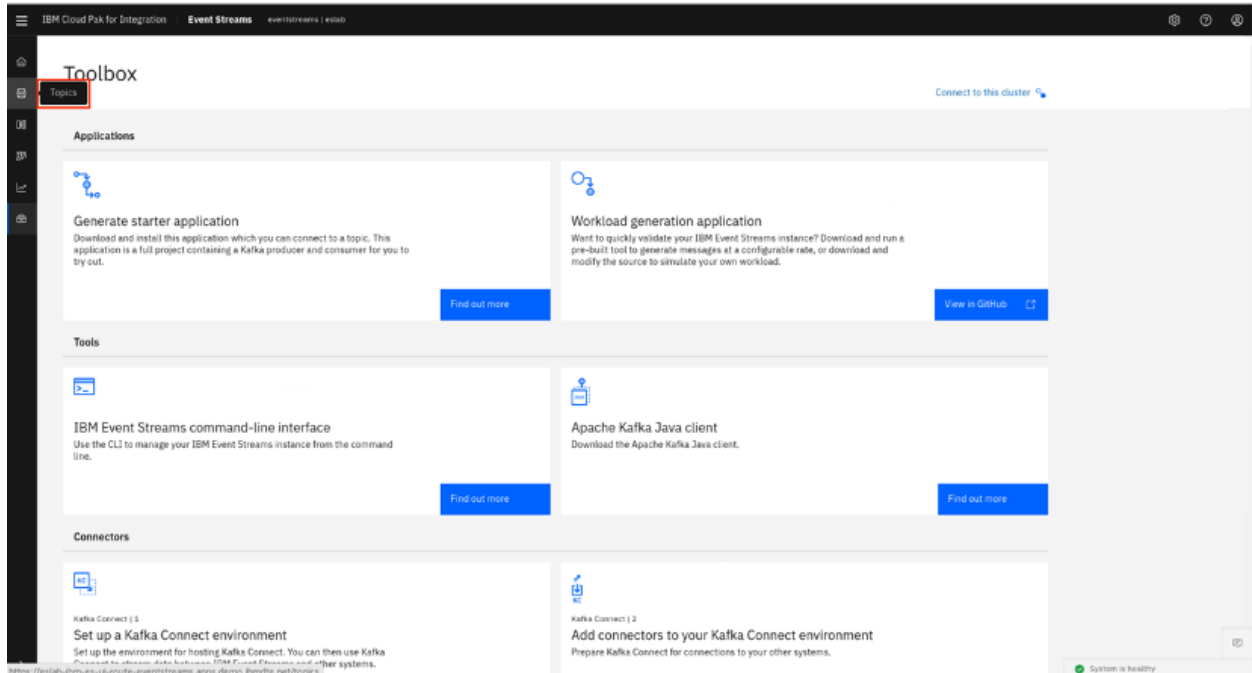
How do I install it?

- Navigate to the extracted file and run this command to build and deploy the application
Java version 8 and Maven are prerequisites to building and running the starter application.
mvn install liberty:run-ovs
- Access the successfully deployed sample application using the following URL
<http://localhost:9080>

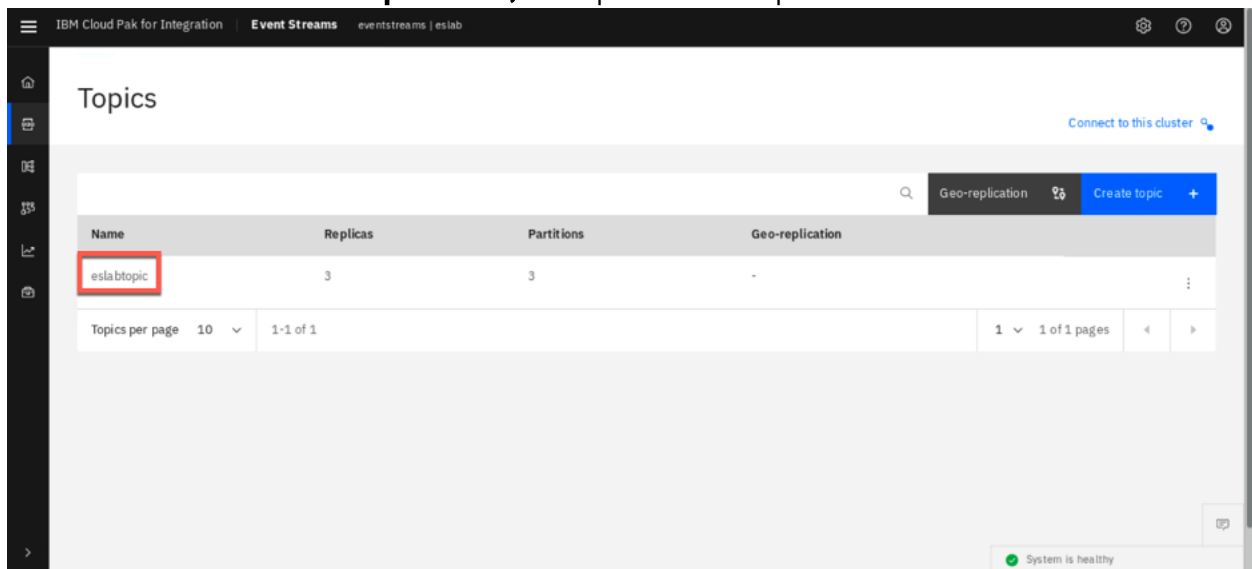
Maven download repository

System is healthy

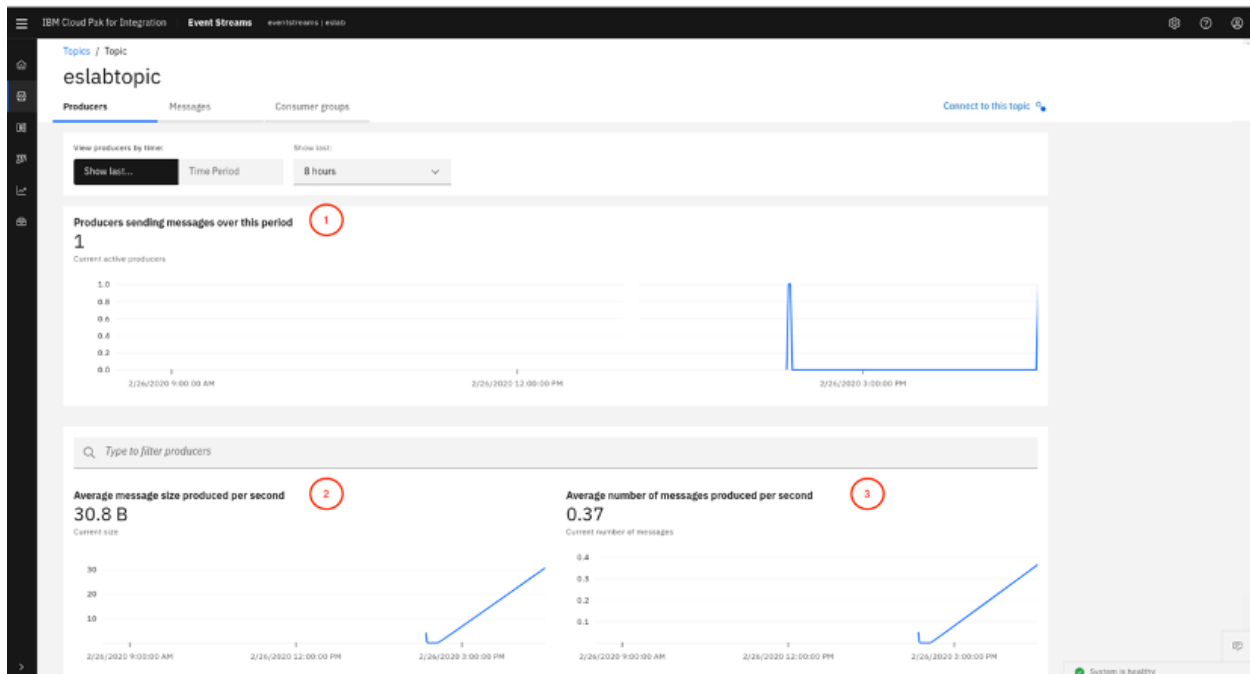
- Click **Topics** in the primary navigation on the left.



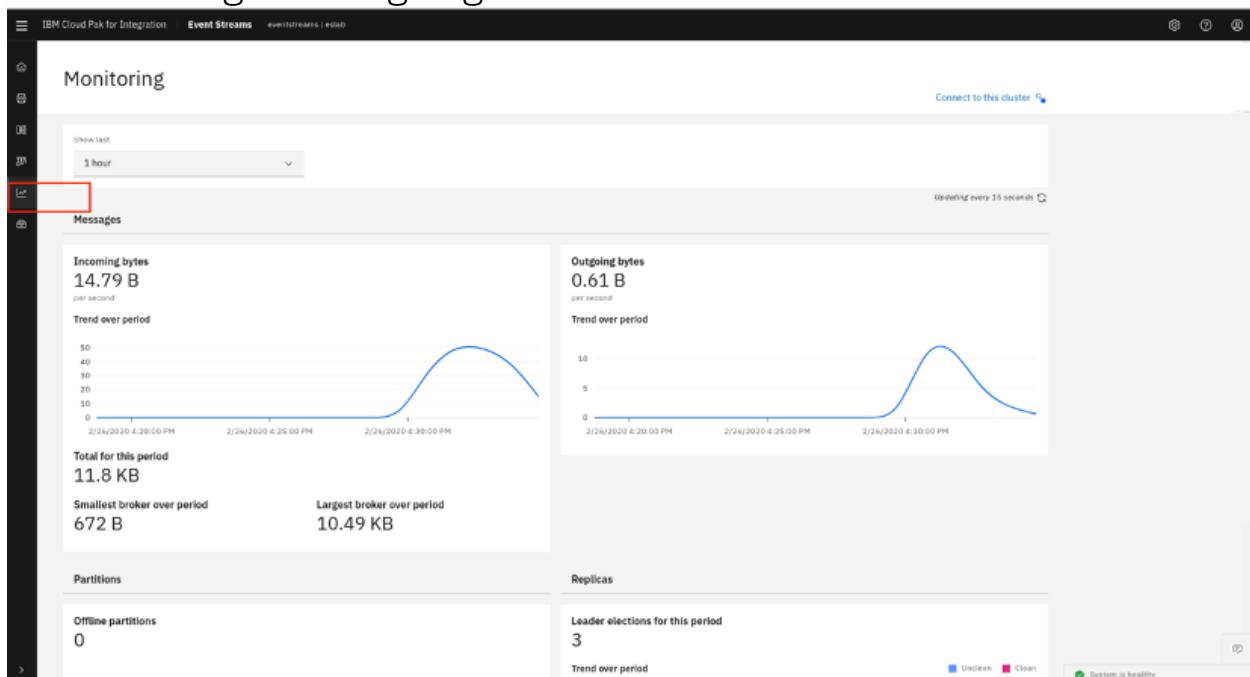
16. Click on **eslabtopic** line, to open the topic.



17. Use the Event Streams interface to evaluate the messages produced, for example, information such as the **Average message size produced per second** and the **Average number of messages produced per second**.



18. Click **Monitoring** in the primary navigation on the left to view the rate of incoming and outgoing data.



Summary

You have completed this Tutorial and you've learned how to:

- Install an Even Streams Instance

- Set up a topic and connected an application to test the flow of data through Event Streams. To try out more labs, go to [Cloud Pak for Integration Demos](#). For more information about the Cloud Pak for Integration, go to <https://www.ibm.com/cloud/cloud-pak-for-integration>