

# Istio Hands-On: Manage Microservice Communication with Kubernetes and Istio Service Mesh

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On your marks.  
Get set.  
Go!

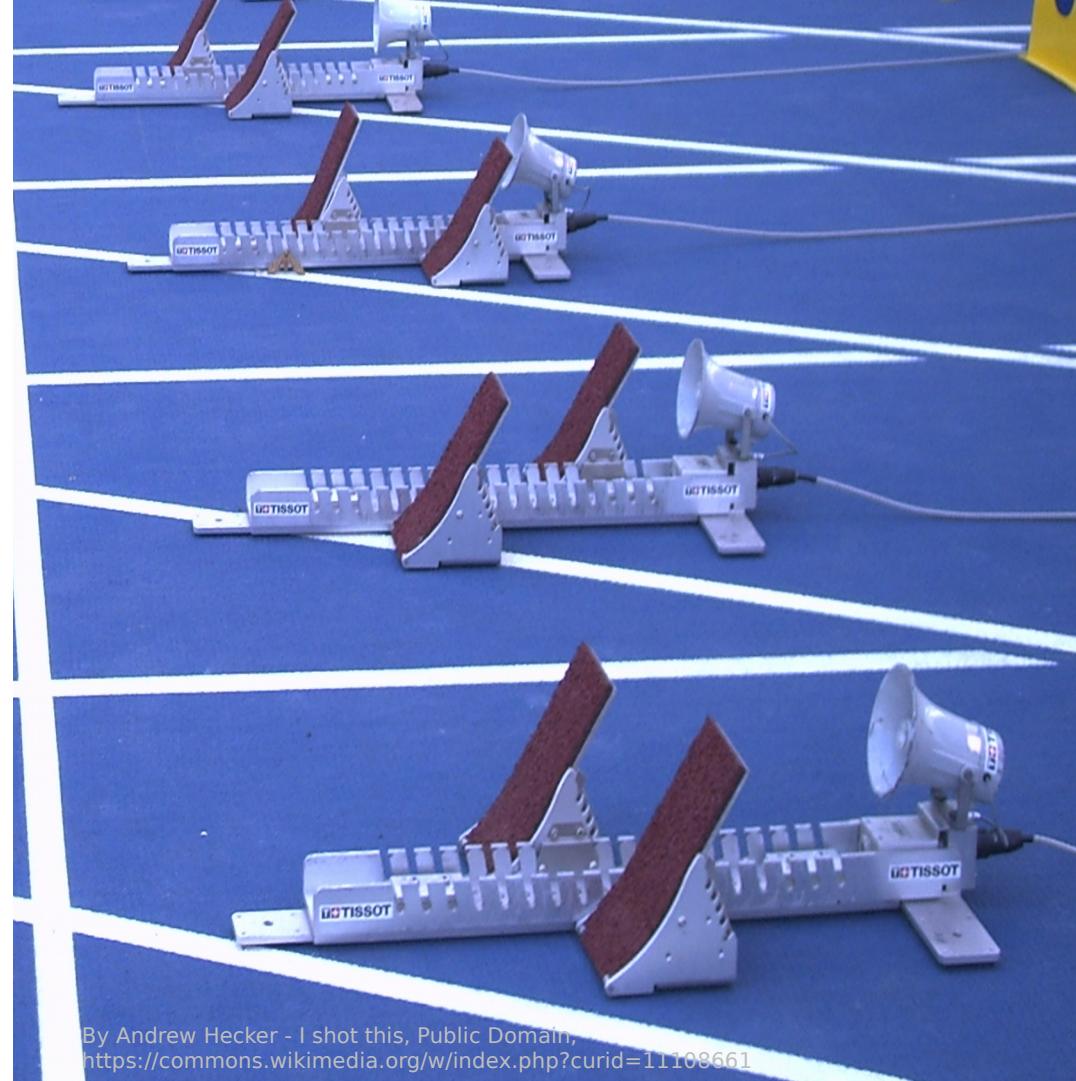
We have limited time for this workshop!  
To start you need  
- an IBM Cloud account  
- a Kubernetes cluster on the IBM Cloud  
Creating a cluster takes about 15 minutes.

Please start here:  
<https://ibm.biz/istio-handson>

and run through

### **Exercise 1:** **Create your Cloud environment**

Please let me know when you finished  
Exercise 1 and your cluster is creating!



By Andrew Hecker - I shot this, Public Domain,  
<https://commons.wikimedia.org/w/index.php?curid=11108661>

# Tip: Display Instructions and Cloud Shell Side-by-side in 2 browser windows. Makes reading and exercising easier ... YMMV :-)

istio-hanson | Manage Microservice Communication with Kubernetes and Istio S...  
View On GitHub

"Get" the environment  
For the rest of the lab we need some parameters that are specific to your environment:

- » Cluster name
- » IP address of the worker node
- » Kube config

1. Execute this command:

```
./get-env.sh
```

This creates a file local.env, have a look at it:

```
cat local.env
```

2. The content of this file is "sourced" in the other script files and you must do that in the Cloud Shell, too, otherwise you can't use `kubectl` later on:

```
source local.env
```

Install Istio

IBM Cloud Shell - Mozilla Firefox

IBM Cloud Shell (Beta)  
Session 2

Welcome to IBM Cloud Shell (Beta)!  
Image version: 0.4.36  
This beta release is not intended for production use. Help us improve future releases by clicking **Feedback** to share your experience!

**Note:** Your Cloud Shell session is running in Dallas. Your workspace includes 500 MB of temporary storage. Your session closes after 30 minutes of inactivity. If you're inactive in Cloud Shell for over an hour, your workspace data is removed. It's also removed if you reach the 4-hour continuous usage or 30-hour weekly usage limits. To track your usage, go to **Usage quota** in the Cloud Shell menu.

**Tip:** Enter 'ibmcloud' to use the IBM Cloud CLI. The us-south region is targeted by default. You can switch the region by running 'ibmcloud target -r <region-name>'.

```
uebele@cloudshell:~$ git clone https://github.com/Harald-U/istio-hanson.git
Cloning into 'istio-hanson'...
remote: Enumerating objects: 171, done.
remote: Counting objects: 100% (171/171), done.
remote: Compressing objects: 100% (120/120), done.
remote: Total 171 (delta 81), reused 126 (delta 46), pack-reused 0
Receiving objects: 100% (171/171), 2.16 MiB | 0 bytes/s, done.
Resolving deltas: 100% (81/81), done.
Checking connectivity... done.
uebele@cloudshell:~$ cd istio-hanson/deployment/
uebele@cloudshell:~/istio-hanson/deployment$ ./get-env.sh
Cluster name: mycluster
Cluster IP: 184.172.247.55
Export environment variables to start using Kubernetes.

export KUBECONFIG=/tmp/ic/cloudshell-818e3964-4dd2-4091-8ecf-859d8253ad13-1-7cbb6b5fdpl9k-2/.bluemix/plugins/container-service/clusters/mycluster/kube-config-hou2-mycluster.yml
-----
Execute 'source local.env' to set the environment

uebele@cloudshell:~/istio-hanson/deployment$ source local.env
uebele@cloudshell:~/istio-hanson/deployment$
```

Current account: uebele

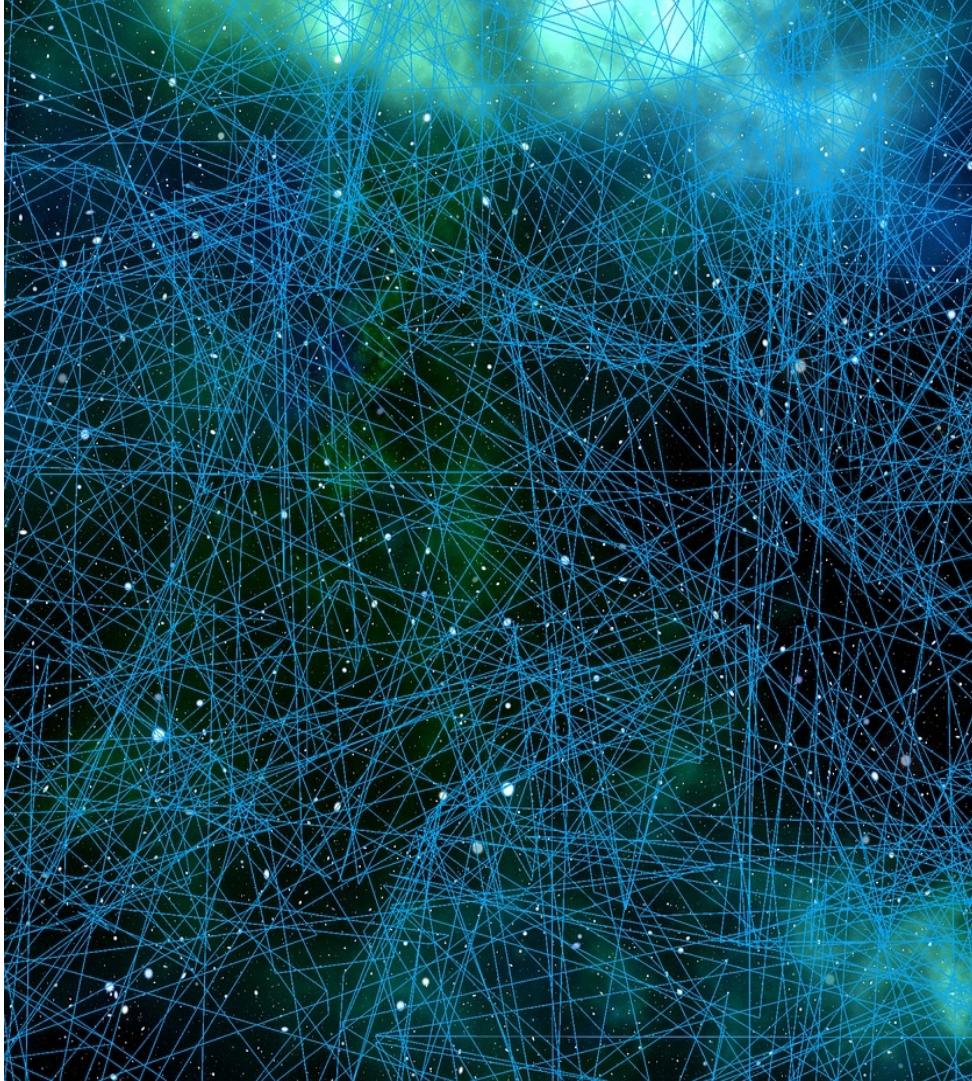
FEEDBACK

“Microservices are a software development technique [...] that structures an application as a collection of loosely coupled services.”

Wikipedia

# Challenges with Microservices

- Communication between services
- 1 microservice = 1...n containers
- Chained invocations
- Pods are ephemeral: name resolution
- Test new version:
  - Canary deployments, A/B testing, dark launches, etc.
- Traffic Management
- Fault injection
- Policy management
- Telemetry
- Security



“Kubernetes (K8s) is an open-source system for automating deployment, scaling, and management of containerized applications.”

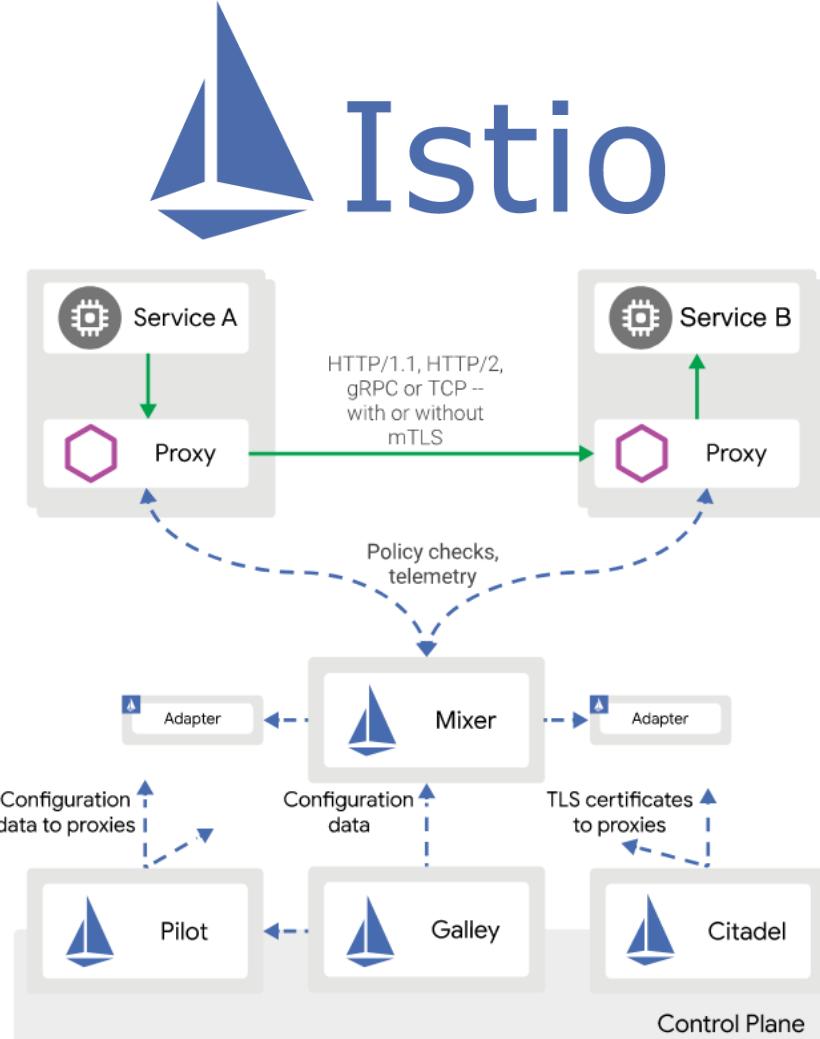
[kubernetes.io](https://kubernetes.io)



**kubernetes**

“Istio is an open platform for providing a uniform way to integrate microservices, manage traffic flow across microservices, enforce policies and aggregate telemetry data.”

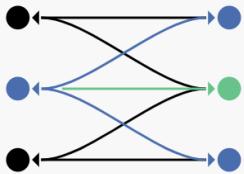
[github.com/istio/istio](https://github.com/istio/istio)





# Istio

Connect, secure, control, and observe services.



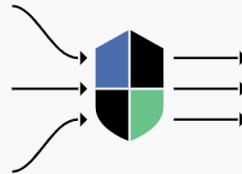
## Connect

Intelligently control the flow of traffic and API calls between services, conduct a range of tests, and upgrade gradually with red/black deployments.



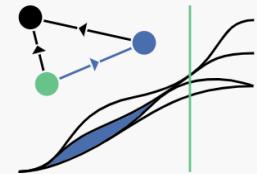
## Secure

Automatically secure your services through managed authentication, authorization, and encryption of communication between services.



## Control

Apply policies and ensure that they're enforced, and that resources are fairly distributed among consumers.

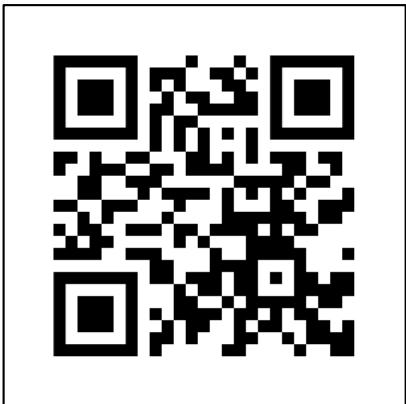


## Observe

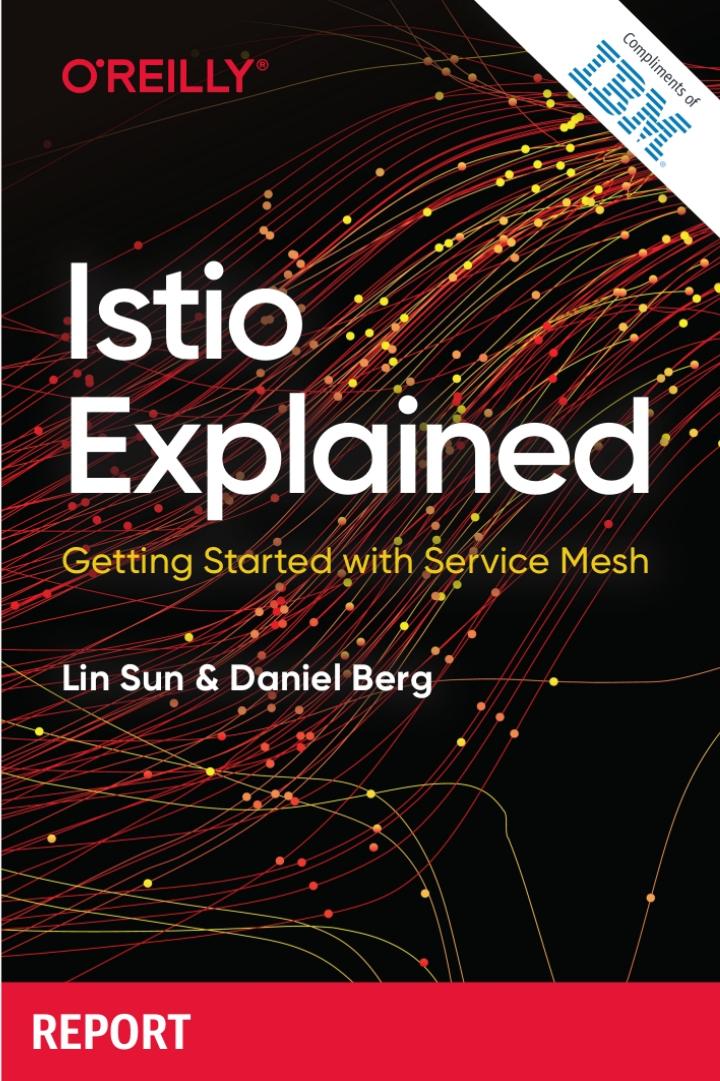
See what's happening with rich automatic tracing, monitoring, and logging of all your services.

# Free Book on Istio

Lin Sun and Dan Berg are also members  
of the Istio Steering Committee



[ibm.biz/oreilly-istio](http://ibm.biz/oreilly-istio)



# Workshop Overview

- Create an IBM Cloud account ✓
- Create an IBM Cloud Kubernetes Cluster ✓
- Use IBM Cloud Shell to work with the cluster
- Install Istio on to the cluster
- Deploy Cloud Native Starter application
- Telemetry: Monitoring, metrics, tracing, Kiali
- Traffic management



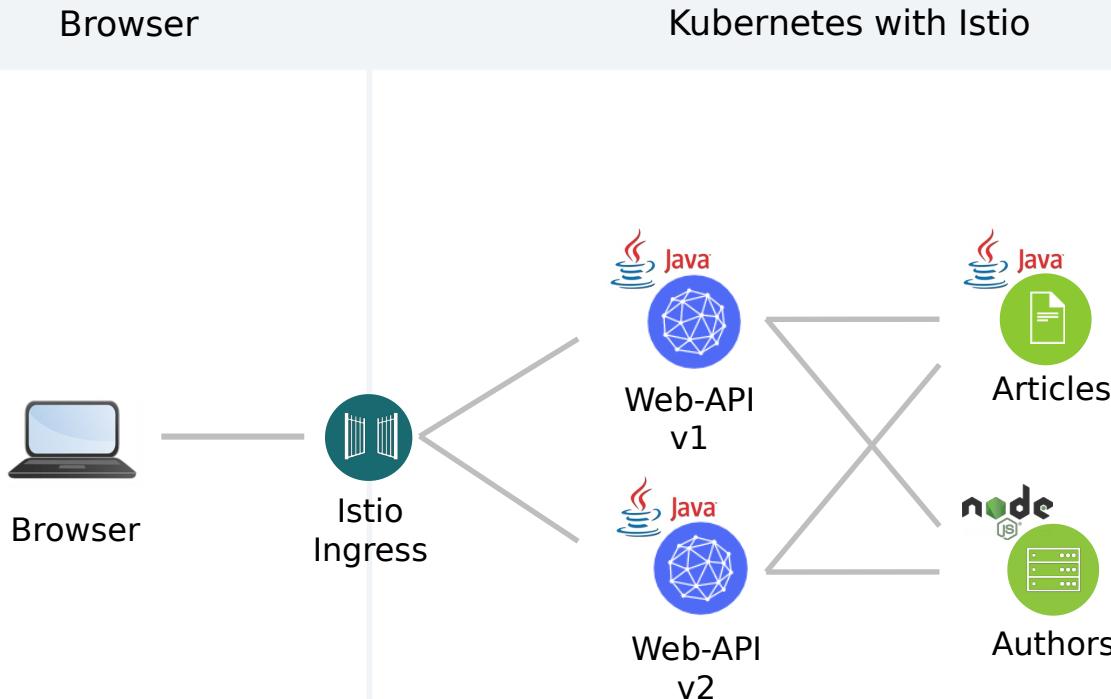
# IBM Cloud Shell (Beta)

## Web-based Linux shell

- Personal workspace and sessions where you can run commands
- Preinstalled CLIs, tools, packages, frameworks
- Immediately logged into IBM Cloud

The screenshot shows the IBM Cloud Shell interface. At the top, there's a dark header bar with the text "IBM Cloud Shell Beta". On the right side of the header are icons for navigation (up, down, left, right) and more options. Below the header, the main area has a title "Session 1" with a close button and a plus sign for creating new sessions. To the right, it says "Current account: uebele". The main content area is a terminal window with a black background and white text. It starts with a welcome message: "Welcome to IBM Cloud Shell (Beta)!". Below that, it shows the "Image version: 0.4.36". A note follows: "This beta release is not intended for production use. Help us improve future releases by clicking **Feedback** to share your experience!". Another note about storage: "Note: Your Cloud Shell session is running in Dallas. Your workspace includes 500 MB of temporary storage. Your session closes after 30 minutes of inactivity. If you're inactive in Cloud Shell for over an hour, your workspace data is removed. It's also removed if you reach the 4-hour continuous usage or 30-hour weekly usage limits. To track your usage, go to **Usage quota** in the Cloud Shell menu.". A tip about the CLI: "Tip: Enter 'ibmcloud' to use the IBM Cloud CLI. The us-south region is targeted by default. You can switch the region by running 'ibmcloud target -r <region-name>'." At the bottom, there's a green prompt "uebele@cloudshell:~\$".

# Example Application: Cloud Native Starter



# “Frontend”

## API Explorer

GET /v1/getmultiple Get most recently added articles

Get most recently added articles

Parameters

No parameters

Execute Clear

Responses

Curl

```
curl -X GET "http://184.172.247.55:31323/web-api/v1/getmultiple" -H "accept: application/json"
```

Request URL

```
http://184.172.247.55:31323/web-api/v1/getmultiple
```

Server response

| Code | Details       |
|------|---------------|
| 200  | Response body |

```
[{"id": "3517308", "title": "Debugging Microservices running in Kubernetes", "url": "http://heidloff.net/article/debugging-microservices-kubernetes", "authorName": "Niklas Heidloff", "authorBlog": "http://heidloff.net", "authorTwitter": "@nheidloff"}, {"id": "3517303", "title": "Dockerizing Java MicroProfile Applications", "url": "http://heidloff.net/article/dockerizing-container-java-microp", "authorName": "Niklas Heidloff", "authorBlog": "http://heidloff.net", "authorTwitter": "@nheidloff"}, {"id": "3517297", "title": "Install Istio and Kiali on IBM Cloud or Minikube", "url": "https://haralduebele.blog/2019/02/22/install-istio-and-kiali-on-ibm-cloud-or-minikub", "authorName": "Harald Uebele", "authorBlog": "https://haralduebele.blog", "authorTwitter": "@harald_u"}, {"id": "3517292", "title": "Three awesome TensorFlow.js Models for Visual Recognition", "url": "http://heidloff.net/article/tensorflowjs-visual-recognition", "authorName": "Niklas Heidloff", "authorBlog": "http://heidloff.net", "authorTwitter": "@nheidloff"}, {"id": "3517286", "title": "Blue Cloud Mirror Architecture Diagrams", "url": "https://haralduebele.blog", "authorName": "Harald Uebele", "authorBlog": "https://haralduebele.blog", "authorTwitter": "@harald_u"}]
```

curl

```
[uebele@harald-t480 ~]$ curl http://184.172.247.55:31323/web-api/v1/getmultiple | jq .
```

| % Total  | % Received | % Xferd  | Average Speed | Time     | Time     | Time     | Current |
|----------|------------|----------|---------------|----------|----------|----------|---------|
| Download | Upload     | Total    | Spent         | Left     | Speed    |          |         |
| 100      | 1236       | 100      | 1236          | 0        | 0        | 2692     | 0       |
| --:--:-- | --:--:--   | --:--:-- | --:--:--      | --:--:-- | --:--:-- | --:--:-- | 2686    |

```
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```

