**EKS Istio Set up**

**Terraform**

* Download terraform\_0.11.10\_windows\_amd64.zip from <https://www.terraform.io/downloads.html>
* Unzip terraform\_0.11.10\_windows\_amd64.zip in a folder C:\terraform
* Press the Windows key and type environment variables.
* Choose Edit environment variables for your account.
* Choose PATH and then choose Edit.
* Add path to the Variable value field. For example: C:\terrfaorm
* Choose OK twice to apply the new settings.
* Close any running command prompts.
* Open the command prompt or power shell and type

**terraform version**

It should return the version number if terraform is installed successfully.

**AWS CLI**

AWS Command Line Interface would be required to installed before running the EKS cluster

Follow the steps from <https://docs.aws.amazon.com/cli/latest/userguide/awscli-install-windows.html> to set up AWS CLI on Windows

Once the terraform and AWS CLI is installed, EKS cluster can be created by running the terraform scripts. Clone the eks\_demo from repository url.

Cd eks\_demo

Run terraform init

Then terraform apply

Click Yes when it prompts.

**Configure kubectl for Amazon EKS**

Amazon EKS uses IAM to provide authentication to your Kubernetes cluster through the AWS IAM Authenticator for Kubernetes. You can configure the stock kubectl client to work with Amazon EKS by installing the AWS IAM Authenticator for Kubernetes and modifying your kubectl configuration file to use it for authentication.

**AWS IAM Authenticator**

* Download the Amazon EKS-vended aws-iam-authenticator binary from Amazon S3:

Windows: <https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/windows/amd64/aws-iam-authenticator.exe>

* Copy the binary to a folder in your PATH. If you have an existing directory in your PATH that you use for command-line utilities, copy the binary to that directory. Otherwise, complete the following steps.
  + - Create a new directory for your command-line binaries, such as C:\ aws authenticator.
    - Copy the kubectl.exe binary to your new directory.
    - Edit your user or system PATH environment variable to add the new directory to your PATH.
    - Close your PowerShell terminal or command prompt and open a new one to pick up the new PATH variable.
* Test that the aws-iam-authenticator binary works

**aws-iam-authenticator help**

Refer : <https://docs.aws.amazon.com/eks/latest/userguide/configure-kubectl.html>

**Kubectl**

Kubernetes uses a command-line utility called **kubectl** for communicating with the cluster API server. Use the Kubernetes command-line tool, **kubectl**, to deploy and manage applications on Kubernetes. Using kubectl, you can inspect cluster resources; create, delete, and update components; look at your new cluster

You have multiple options to download and install **kubectl** for your operating system

**Install with Chocolatey on Windows**

If you are on Windows and using [Chocolatey](https://chocolatey.org/) package manager, you can install kubectl with Chocolatey.

* Run the installation command:

**choco install kubernetes-cli**

* Test to ensure the version you installed is sufficiently up-to-date:

**kubectl version**

* Change to your %HOME% directory:

**cd C:\users\yourusername**

* Create the .kube directory:

**mkdir .kube**

* Change to the .kube directory you just created:

**cd .kube**

* Configure kubectl to use a remote Kubernetes cluster:

**New-Item config -type file**

Refer: <https://kubernetes.io/docs/tasks/tools/install-kubectl/>

**Install with PowerShell**

* Open a PowerShell terminal.
* Download the Amazon EKS-vended kubectl binary from Amazon S3:

**curl -o kubectl.exe https://amazon-eks.s3-us-west-2.amazonaws.com/1.10.3/2018-07-26/bin/windows/amd64/kubectl.exe**

* Copy the binary to a folder in your PATH. If you have an existing directory in your PATH that you use for command-line utilities, copy the binary to that directory. Otherwise, complete the following steps.
  + - Create a new directory for your command-line binaries, such as C:\bin.
    - Copy the kubectl.exe binary to your new directory.
    - Edit your user or system PATH environment variable to add the new directory to your PATH.
    - Close your PowerShell terminal and open a new one to pick up the new PATH variable.
* After you install kubectl, you can verify its version with the following command:

**kubectl version --short –client**

Example output:

**Client Version: v1.10.3**

Refer : <https://docs.aws.amazon.com/eks/latest/userguide/install-kubectl.html>

Once the kubectl is installed then please run the following command so that AWS authenticate the kubectl using aws-iam-authenticator to connect to the EKS.

* **terraform output kubeconfig > C:\users\yourusername\.kube\config**
* **terraform output config-map-aws-auth > config-map-aws-auth.yaml**
* **kubectl apply -f config-map-aws-auth.yaml**
* **kubectl get node**

There are many ways to install **Istio** as mentioned in the docs <https://istio.io/docs/setup/kubernetes/> but we will be using **Helm** to install **Istio**

**HELM (Package Manager for Kubernetes)**

Helm helps you manage Kubernetes applications — Helm Charts helps you define, install, and upgrade even the most complex Kubernetes application.

* Download the latest version of the compressed executable from the Helm github site, <https://github.com/kubernetes/helm/releases> . Click the windows link and it should download to your computer.
* Navigate to the folder you downloaded the helm-vX.X.X-windows-amd64.zip compressed file from and unzip the file into the new directory
* Edit your user or system PATH environment variable to add the new directory to your PATH.
* Close your PowerShell terminal or command prompt and open a new one to pick up the new PATH variable.
* Open a new command line window and type helm on the command line to make sure you have access to helm from the command line

Refer : <https://medium.com/@JockDaRock/take-the-helm-with-kubernetes-on-windows-c2cd4373104b>

**Istio**

* Download the latest version of the compressed executable from the Istio github site, <https://github.com/istio/istio/releases> . Click the windows link and it should download to your computer.
* Navigate to the folder you downloaded the **istio-x.x.x-win.zip** compressed file from and unzip the file into the new directory. For example, C:\user\yourusername\istio-x.x.x
* Edit your user or system PATH environment variable to add the new directory with bin to your PATH

For example, C:\user\yourusername\istio-x.x.x\bin

* Close your PowerShell terminal or command prompt and open a new one to pick up the new PATH variable.
* Open a new command line window and type istioctl on the command line to make sure you have access to istio from the command line

Refer: <https://istio.io/docs/setup/kubernetes/download-release/>

**Steps to install Istio using Helm**

#Set up a service account to perform deployment of istio.

* **kubectl create -f <Istio Dir>/install/kubernetes/helm/helm-service-account.yaml**

# Install Tiller

* **helm init --service-account tiller**

# Install Istio

* **helm install install/kubernetes/helm/istio --name istio --namespace istio-system --set global.configValidation=false --set grafana.enabled=true --set tracing.enabled=true --set servicegraph.enabled=true**

# Verify the istio is install by running the following commands

* **kubectl get svc -n istio-system**
* **kubectl get pods -n istio-system**

# Below commands helps you to run an example already present in Istio

* **istioctl kube-inject -f <Istio Dir>\samples\bookinfo\platform\kube\bookinfo.yaml > bookinfo\_inject.yaml**
* **kubectl create -f <Istio Dir>\samples\bookinfo\_inject.yaml**
* **kubectl apply -f <Istio Dir>\samples\bookinfo\networking\bookinfo-gateway.yaml**

This command returns **ALB/ELB** url. Similar to ab6cdd690ed3311e8aee512b9077a610-1607002849.us-east-1.elb.amazonaws.com

* **kubectl get svc istio-ingressgateway -n istio-system -o wide**

Copy the ALB/ELB url and replace <ALB/ELB> in the below url

**http://<ALB/ELB>/productpage**

Once you replaced the ALB value, copy the complete url paste in the browser and hit enter. It should open a page

To delete Istio use the below command

* **helm delete --purge istio**

**Steps to run the Istio Demo**

Create Pod and Service for Account

**istioctl kube-inject -f account.yml > windows\account\_inject.yml**

**kubectl apply -f windows\account\_inject.yml**

Create Pod and Service for Customer

**istioctl kube-inject -f customer.yml > windows\customer\_inject.yml**

**kubectl apply -f windows\customer\_inject.yml**

Create Gateway and Virtual Service

**kubectl apply -f gateway.yml**

Get the ELB url

**kubectl get svc istio-ingressgateway -n istio-system -o wide**

**Liveness/Health Check**

**istioctl kube-inject -f customer\_liveness\_probe.yml > windows\customer\_liveness\_probe\_inject.yml**

**kubectl apply -f windows\customer\_liveness\_probe\_inject.yml**

**kubectl get pods**

**Readiness Check**

**istioctl kube-inject -f customer\_liveness\_readiness\_probe.yml > windows\customer\_liveness\_readiness\_probe\_inject.yml**

**kubectl apply -f windows\customer\_liveness\_readiness\_probe\_inject.yml && watch -n1 kubectl get pods**