

- 1) kubPS C:\Program Files> Invoke-WebRequest -Uri
 "https://raw.githubusercontent.com/keycloak/keycloak-quickstarts/latest/kubernetes/keycloak.yaml" -OutFile "keycloak.yaml"
- 2) Press Ls. You will find the file created:

```
PS C:\Program Files> Invoke-WebRequest -Uri "https://raw.githubusercontent.com/keycloak/keycloak-quickstarts/latest/kubernetes/keycloak.yaml" -OutFile "keycloak.yaml"
>>
PS C:\Program Files> ls

Directory: C:\Program Files

Mode                LastWriteTime         Length Name
----                -
d-----          5/29/2024 12:37 AM              Common Files
d-----          5/23/2024  8:35 PM              Crashpad
da-----          5/23/2024 11:10 PM              CUAssistant
d-----          5/26/2024 10:11 PM              Docker
d-----          5/23/2024  8:35 PM              Google
d-----          5/25/2024  6:58 PM              Intel
d-----          5/25/2024  6:40 PM              Internet Explorer
d-----          5/27/2024  1:20 PM              Java
d-----          5/27/2024  5:26 PM              Kubernetes
d-----          5/24/2024  1:46 AM              Microsoft Office 15
d-----          5/26/2024  5:25 PM              Microsoft Update Health Tools
d-----         12/7/2019 10:14 AM              ModifiableWindowsApps
d-----          5/24/2024  3:13 PM              MsEdgeCrashpad
d-----          5/25/2024  6:04 PM              NVIDIA Corporation
d-----          5/26/2024  3:45 PM              obs-studio
d-----          5/29/2024 12:50 AM              OpenSSL-Win64
d-----          5/26/2024  4:42 PM              PCHHealthCheck
d-----          5/25/2024  6:54 PM              Realtek
da-----          5/26/2024  4:44 PM              rempl
da-----          5/26/2024  4:44 PM              ruxim
d-----          5/26/2024 12:38 AM              Windows Defender
d-----          5/26/2024  5:26 PM              Windows Defender Advanced Threat Protection
d-----          5/25/2024  6:54 PM              Windows Mail
d-----          5/25/2024  6:40 PM              Windows Media Player
d-----         12/7/2019  3:53 PM              Windows Multimedia Platform
d-----          5/25/2024  6:22 PM              Windows NT
d-----          5/25/2024  6:40 PM              Windows Photo Viewer
d-----         12/7/2019  3:53 PM              Windows Portable Devices
d-----         12/7/2019 10:31 AM              Windows Security
d-----         12/7/2019 10:31 AM              WindowsPowerShell
d-----          5/26/2024  6:25 PM              WSL
-a-----          5/31/2024  3:29 PM             958 keycloak.yaml
```

- 3) PS C:\Program Files> Invoke-WebRequest -Uri
 "https://raw.githubusercontent.com/keycloak/keycloak-quickstarts/latest/kubernetes/keycloak-ingress.yaml" -OutFile "keycloak-ingress.yaml"
- Now we have second file created:

```
PS C:\Program Files> ls

Directory: C:\Program Files

Mode                LastWriteTime         Length Name
----                -
d-----          5/29/2024 12:37 AM             Common Files
d-----          5/23/2024  8:35 PM             Crashpad
da-----          5/23/2024 11:10 PM             CUAssistant
d-----          5/26/2024 10:11 PM             Docker
d-----          5/23/2024  8:35 PM             Google
d-----          5/25/2024  6:58 PM             Intel
d-----          5/25/2024  6:40 PM             Internet Explorer
d-----          5/27/2024  1:20 PM             Java
d-----          5/27/2024  5:26 PM             Kubernetes
d-----          5/24/2024  1:46 AM             Microsoft Office 15
d-----          5/26/2024  5:25 PM             Microsoft Update Health Tools
d-----         12/7/2019 10:14 AM             ModifiableWindowsApps
d-----          5/24/2024  3:13 PM             MsEdgeCrashpad
d-----          5/25/2024  6:04 PM             NVIDIA Corporation
d-----          5/26/2024  3:45 PM             obs-studio
d-----          5/29/2024 12:50 AM             OpenSSL-Win64
d-----          5/26/2024  4:42 PM             PCHealthCheck
d-----          5/25/2024  6:54 PM             Realtek
da-----          5/26/2024  4:44 PM             rempl
da-----          5/26/2024  4:44 PM             ruxim
d-----          5/26/2024 12:38 AM             Windows Defender
d-----          5/26/2024  5:26 PM             Windows Defender Advanced Threat Protection
d-----          5/25/2024  6:54 PM             Windows Mail
d-----          5/25/2024  6:40 PM             Windows Media Player
d-----         12/7/2019  3:53 PM             Windows Multimedia Platform
d-----          5/25/2024  6:22 PM             Windows NT
d-----          5/25/2024  6:40 PM             Windows Photo Viewer
d-----         12/7/2019  3:53 PM             Windows Portable Devices
d-----         12/7/2019 10:31 AM             Windows Security
d-----         12/7/2019 10:31 AM             WindowsPowerShell
d-----          5/26/2024  6:25 PM             WSL
-a-----          5/31/2024  3:31 PM             362 keycloak-ingress.yaml
-a-----          5/31/2024  3:29 PM             958 keycloak.yaml
```

- 4) Write and Press `minikube start` to make sure kubernetes is enabled and running from the Docker Desktop settings

```
PS C:\Program Files> minikube start
>>
W0531 15:41:07.347822 13524 main.go:291] Unable to resolve the current Docker CLI context "default": context "default"
: context not found: open C:\Users\user\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a33
f0688f\meta.json: The system cannot find the path specified.
* minikube v1.33.1 on Microsoft Windows 10 Pro 10.0.19042.2965 Build 19042.2965
* Using the docker driver based on existing profile
* Starting "minikube" primary control-plane node in "minikube" cluster
* Pulling base image v0.0.44 ...
* Restarting existing docker container for "minikube" ...
* Preparing Kubernetes v1.30.0 on Docker 26.1.1 ...
```

- 5) Create namespace exp name: `keycloak-iam`

```
PS C:\Program Files> kubectl create namespace keycloak-iam
>>
namespace/keycloak-iam created
```

Namespaces in Kubernetes are used to organize and manage resources within a cluster. They provide a way to create isolated environments within the same cluster, which can be especially useful for separating different projects, teams, or environments (e.g., development, staging, production).

To check it is done created we run this command:

```
PS C:\Program Files> kubectl get namespace
NAME          STATUS   AGE
default       Active   3d21h
ingress-nginx Active   3d21h
keycloak-iam   Active   3m29s
kube-node-lease Active   3d21h
kube-public    Active   3d21h
kube-system    Active   3d21h
```

6) We start to deploy our TLS:

You have to download OpenSSL from this link:

<https://slproweb.com/products/Win32OpenSSL.html>

Then you go to your path where is downloaded and you run this command where you will find as below:

```
PS C:\Program Files\OpenSSL-Win64> ls

Directory: C:\Program Files\OpenSSL-Win64

Mode                LastWriteTime         Length Name
----                -
d-----          5/29/2024 12:37 AM                bin
d-----          5/29/2024 12:37 AM                exp
d-----          5/29/2024 12:38 AM               include
d-----          5/29/2024 12:37 AM                lib
d-----          5/29/2024 12:39 AM               tests
-a-----          4/11/2024  9:30 AM             165 acknowledgements.txt
-a-----          4/11/2024  9:30 AM             1041 authors.txt
-a-----          4/11/2024  9:30 AM            802805 changes.txt
-a-----          4/11/2024  9:30 AM             7100 c_rehash.pl
-a-----          4/11/2024  9:30 AM           6368256 libcrypto-3-x64.dll
-a-----          4/11/2024  9:30 AM           1246720 libssl-3-x64.dll
-a-----          4/11/2024  9:30 AM             10352 license.txt
-a-----          4/11/2024  9:30 AM             86366 news.txt
-a-----          4/11/2024  9:30 AM             8453 readme.txt
-a-----          4/11/2024  9:30 AM              194 start.bat
-a-----          5/29/2024 12:50 AM             1184 tls.crt
-a-----          5/29/2024 12:50 AM             1732 tls.key
-a-----          5/29/2024 12:39 AM            181617 unins000.dat
-a-----          5/29/2024 12:36 AM            730789 unins000.exe
```

7)

We run this command: `kubectl create secret tls my-tls --key="tls.key" --cert="tls.crt" -n keycloak-iam`

```
PS C:\Program Files\OpenSSL-Win64> kubectl create secret tls my-tls --key="tls.key" --cert="tls.crt" -n keycloak-iam
secret/my-tls created
```

To check:

```
PS C:\Program Files\OpenSSL-Win64> kubectl get secrets -n keycloak-iam
NAME          TYPE          DATA   AGE
my-tls        kubernetes.io/tls 2        2m41s
```

8)

We run these commands to define the lps

```

PS C:\Program Files\OpenSSL-Win64> minikube ip
W0531 16:07:20.257201 1576 main.go:291] Unable to resolve the current Docker CLI context "default": context "default"
: context not found: open C:\Users\user\.docker\contexts\meta\37a8eec1ce19687d132fe29051dca629d164e2c4958ba141d5f4133a3
f0688f\meta.json: The system cannot find the path specified.
192.168.49.2
PS C:\Program Files\OpenSSL-Win64> ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Ethernet adapter vEthernet (WSL):

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::72cf:209b:345a:6d00%44
    IPv4 Address. . . . . : 172.24.144.1
    Subnet Mask . . . . . : 255.255.240.0
    Default Gateway . . . . . :

Wireless LAN adapter Connexion au réseau local* 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Connexion au réseau local* 3:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::5bd3:a91b:22c4:347%6
    IPv4 Address. . . . . : 172.20.10.4
    Subnet Mask . . . . . : 255.255.255.240
    Default Gateway . . . . . : 172.20.10.1

Ethernet adapter Connexion réseau Bluetooth:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :
PS C:\Program Files\OpenSSL-Win64>

```

9) Navigate to hosts to make some edits:

```

PS C:\Program Files\OpenSSL-Win64> cd C:\Windows\System32\drivers\etc
PS C:\Windows\System32\drivers\etc> ls

Directory: C:\Windows\System32\drivers\etc

Mode                LastWriteTime         Length Name
----                -
-a----           5/29/2024   2:03 AM           1086 hosts
-a----           5/30/2024   9:17 PM            444 hosts.ics
-a----          12/7/2019  10:12 AM          3683 lmhosts.sam
-a----           7/16/2016   1:45 PM            407 networks
-a----           7/16/2016   1:45 PM          1358 protocol
-a----           7/16/2016   1:45 PM          17463 services

PS C:\Windows\System32\drivers\etc> notepad C:\Windows\System32\drivers\etc\hosts
>>

```

We add minikube IP; and we make sure host docker internal exists:

```
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
#       102.54.94.97      rhino.acme.com          # source server
#       38.25.63.10      x.acme.com              # x client host

# localhost name resolution is handled within DNS itself.
#       127.0.0.1        localhost
#       ::1              localhost

# Added by Docker Desktop
172.20.10.4 host.docker.internal
172.20.10.4 gateway.docker.internal
192.168.49.2 my-keycloak.com

# To allow the same kube context to work on the host and the container:
127.0.0.1 kubernetes.docker.internal
192.168.49.2 minikube
# End of section
```

Save the file and close it.

10)

We go back to this path:

```
PS C:\Program Files> ls
```

```
Directory: C:\Program Files
```

Mode	LastWriteTime	Length	Name
d-----	5/29/2024 12:37 AM		Common Files
d-----	5/23/2024 8:35 PM		Crashpad
da----	5/23/2024 11:10 PM		CUAssistant
d-----	5/26/2024 10:11 PM		Docker
d-----	5/23/2024 8:35 PM		Google
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d-----	5/25/2024 6:40 PM		Internet Explorer
d-----	5/27/2024 1:20 PM		Java
d-----	5/27/2024 5:26 PM		Kubernetes
d-----	5/24/2024 1:46 AM		Microsoft Office 15
d-----	5/26/2024 5:25 PM		Microsoft Update Health Tools
d-----	12/7/2019 10:14 AM		ModifiableWindowsApps
d-----	5/24/2024 3:13 PM		MsEdgeCrashpad
d-----	5/25/2024 6:04 PM		NVIDIA Corporation
d-----	5/26/2024 3:45 PM		obs-studio
d-----	5/29/2024 12:50 AM		OpenSSL-Win64
d-----	5/26/2024 4:42 PM		PCHealthCheck
d-----	5/25/2024 6:54 PM		Realtek
da----	5/26/2024 4:44 PM		rempl
da----	5/26/2024 4:44 PM		ruxim
d-----	5/26/2024 12:38 AM		Windows Defender
d-----	5/26/2024 5:26 PM		Windows Defender Advanced Threat Protection
d-----	5/25/2024 6:54 PM		Windows Mail
d-----	5/25/2024 6:40 PM		Windows Media Player
d-----	12/7/2019 3:53 PM		Windows Multimedia Platform
d-----	5/25/2024 6:22 PM		Windows NT
d-----	5/25/2024 6:40 PM		Windows Photo Viewer
d-----	12/7/2019 3:53 PM		Windows Portable Devices
d-----	12/7/2019 10:31 AM		Windows Security
d-----	12/7/2019 10:31 AM		WindowsPowerShell
d-----	5/26/2024 6:25 PM		WSL
-a----	5/31/2024 3:31 PM	362	keycloak-ingress.yaml
-a----	5/31/2024 3:29 PM	958	keycloak.yaml

```
PS C:\Program Files> notepad keycloak-ingress.yaml
>>
PS C:\Program Files>
```

```
keycloak-ingress - Bloc-notes
Fichier Edition Format Affichage Aide
apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: keycloak-external-config
spec:
  tls:
    - hosts:
        - my-keycloak.com
      secretName: my-tls
  rules:
    - host: my-keycloak.com
      http:
        paths:
          - path: /
            pathType: Prefix
            backend:
              service:
                name: keycloak-service
                port:
                  number: 443
```

Now you run this command:

```
PS C:\Program Files> notepad keycloak.yaml
```

This is content of file; you need to make sure you change and you add the necessary info:

apiVersion: v1

kind: Service

```
metadata:
  name: keycloak-service
  labels:
    app: keycloak
spec:
  ports:
    - name: https
      port: 443
      targetPort: 8080
  selector:
    app: keycloak
  type: LoadBalancer
---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: keycloak
  labels:
    app: keycloak
spec:
  replicas: 2
  selector:
    matchLabels:
      app: keycloak
  template:
    metadata:
      labels:
        app: keycloak
    spec:
      containers:
        - name: keycloak
          image: quay.io/keycloak/keycloak:24.0.4
          volumeMounts:
            - name: tls
              mountPath: "/etc/ssl"
              readOnly: true
          args: ["start"]
          env:
            - name: KEYCLOAK_ADMIN
              value: 'admin'
            - name: KEYCLOAK_ADMIN_PASSWORD
              value: 'admin'
            - name: KC_PROXY
              value: 'edge'
            - name: KC_HOSTNAME
              value: my-keycloak.com
            - name: KC_HOSTNAME_STRICT_HTTPS
              value: 'true'
```

- name: KC_LOG_LEVEL
value: 'INFO'
- name: KC_DB
value: 'postgres'
- name: KC_DB_URL
value: 'jdbc:postgresql://192.168.49.1:5432/keycloak'
- name: KC_DB_USERNAME
value: 'keycloak'
- name: KC_DB_PASSWORD
value: 'test123'
- name: KC_TRANSACTION_XA_ENABLED
value: 'true'
- name: KC_HEALTH_ENABLED
value: 'true'
- name: KC_METRICS_ENABLED
value: 'true'

ports:

- name: http
containerPort: 8080

readinessProbe:

httpGet:
scheme: HTTP
path: /realms/master
port: 8080
initialDelaySeconds: 60
periodSeconds: 1


volumes:

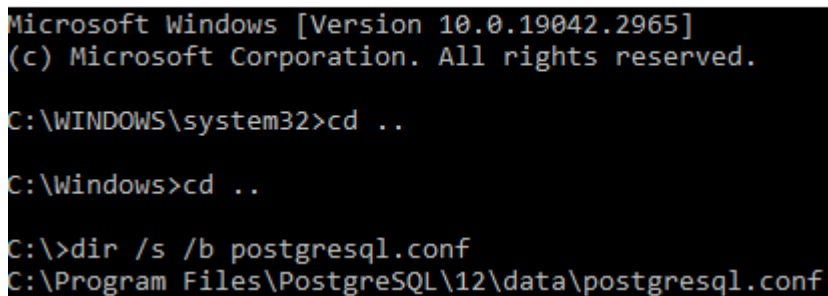
- name: tls
secret:
secretName: my-tls
optional: false

11) You have to install PostgreSQL from here:

<https://www.enterprisedb.com/downloads/postgres-postgresql-downloads>

After installing; go to CMD and run this command:

 Administrator: Command Prompt - dir /s /b postgresql.conf



```
Microsoft Windows [Version 10.0.19042.2965]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd ..

C:\Windows>cd ..

C:\>dir /s /b postgresql.conf
C:\Program Files\PostgreSQL\12\data\postgresql.conf
```

Now follow the path and open the file and made these changes, make sure this is what you have in the file:


```
#
#                                     d    = days

#-----
# FILE LOCATIONS
#-----

# The default values of these variables are driven from the -D command-line
# option or PGDATA environment variable, represented here as ConfigDir.

#data_directory = 'ConfigDir'          # use data in another directory
#                                     # (change requires restart)
#hba_file = 'ConfigDir/pg_hba.conf'    # host-based authentication file
#                                     # (change requires restart)
#ident_file = 'ConfigDir/pg_ident.conf' # ident configuration file
#                                     # (change requires restart)

# If external_pid_file is not explicitly set, no extra PID file is written.
#external_pid_file = ''                # write an extra PID file
#                                     # (change requires restart)

#-----
# CONNECTIONS AND AUTHENTICATION
#-----

# - Connection Settings -

listen_addresses = '*'                # what IP address(es) to listen on;
#                                     # comma-separated list of addresses;
#                                     # defaults to 'localhost'; use '*' for all
#                                     # (change requires restart)
port = 5432                           # (change requires restart)
max_connections = 100                  # (change requires restart)
#superuser_reserved_connections = 3    # (change requires restart)
#unix_socket_directories = ''          # comma-separated list of directories
#                                     # (change requires restart)
#unix_socket_group = ''                # (change requires restart)
#unix_socket_permissions = 0777       # begin with 0 to use octal notation
#                                     # (change requires restart)
#bonjour = off                         # advertise server via Bonjour
#                                     # (change requires restart)
#bonjour_name = ''                    # defaults to the computer name
#                                     # (change requires restart)
```

Now run this command into cmd to get the path of this file, and open it:

```
C:\>dir /s /b pg_hba.conf
C:\Program Files\PostgreSQL\12\data\pg_hba.conf
C:\Program Files\PostgreSQL\9.6\data\pg_hba.conf
```

Run this into PowerShell and get the IP address:

```
PS C:\Program Files> docker network inspect bridge
>>
[
  {
    "Name": "bridge",
    "Id": "40b6dd8047fa85ec536505a58ce0d785dede9f9365e4c3016ab046bdfae5b825",
    "Created": "2024-05-31T13:20:04.963238775Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": null,
      "Config": [
        {
          "Subnet": "172.17.0.0/16",
          "Gateway": "172.17.0.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {},
    "Options": {
      "com.docker.network.bridge.default_bridge": "true",
      "com.docker.network.bridge.enable_icc": "true",
      "com.docker.network.bridge.enable_ip_masquerade": "true",
      "com.docker.network.bridge.host_binding_ipv4": "0.0.0.0",
      "com.docker.network.bridge.name": "docker0",
      "com.docker.network.driver.mtu": "1500"
    },
    "Labels": {}
  }
]
```

You add your Docker bridge address and your machine address:

#	TYPE	DATABASE	USER	ADDRESS	METHOD
# IPv4 local connections:					
host	all		all	127.0.0.1/32	md5
host	all		all	172.20.10.4/16	md5
host	all		all	172.17.0.1/16	md5
# IPv6 local connections:					
host	all		all	:::1/128	md5
# Allow replication connections from localhost, by a user with the					
# replication privilege.					
...			

Now run these 2 commands:

```
PS C:\Program Files> Stop-Service -Name "postgresql*"
>>
PS C:\Program Files> Start-Service -Name "postgresql*"
>>
WARNING: Waiting for service 'postgresql-x64-9.6 - PostgreSQL Server 9.6 (postgresql-x64-9.6)' to start...
PS C:\Program Files>
```

```
PS C:\Program Files> Get-Service -Name "postgresql*"
>>

Status      Name                      DisplayName
-----
Running     postgresql-x64-12        postgresql-x64-12 - PostgreSQL Serv...
Running     postgresql-x64-9.6       postgresql-x64-9.6 - PostgreSQL Ser...
```

Run these 2 commands:

```
PS C:\Program Files> kubectl create -f keycloak.yaml -n keycloak-iam
Error from server (AlreadyExists): error when creating "keycloak.yaml": services "keycloak-service" already exists
Error from server (AlreadyExists): error when creating "keycloak.yaml": deployments.apps "keycloak" already exists
PS C:\Program Files> kubectl create -f keycloak-ingress.yaml -n keycloak-iam
ingress.networking.k8s.io/keycloak-external-config created
```

Then this:

```
PS C:\Program Files> kubectl get all -n keycloak-iam
NAME                                READY   STATUS    RESTARTS   AGE   IP              NODE     NOMINATED NODE   READINESS GATES
pod/keycloak-b4fbbf77b-8n47c        0/1     Running   0           3m22s  10.244.0.27     minikube <none>          <none>
pod/keycloak-b4fbbf77b-9t68w        0/1     Running   0           3m22s  10.244.0.26     minikube <none>          <none>

NAME                                TYPE          CLUSTER-IP   EXTERNAL-IP   PORT(S)          AGE   SELECTOR
service/keycloak-service            LoadBalancer  10.97.7.235   <pending>     443:31816/TCP    18m   app=keycloak

NAME                                READY   UP-TO-DATE   AVAILABLE   AGE   CONTAINERS   IMAGES                               SELECTOR
deployment.apps/keycloak            0/2     2             0           3m28s  keycloak     quay.io/keycloak/keycloak:24.0.4    app=keycloak

NAME                                DESIRED   CURRENT   READY   AGE   CONTAINERS   IMAGES                               SELECTOR
replicaset.apps/keycloak-b4fbbf77b 2         2         0       3m25s  keycloak     quay.io/keycloak/keycloak:24.0.4    app=keycloak,pod-template-hash=b4fbbf77b
```

Then run:

Minikube dashboard

Also, on powershell Windows run this command:

```
$minikubeIP = minikube ip
```

```
$KEYCLOAK_URL = "https://keycloak.$minikubeIP.nip.io"
```

```
Write-Output ""
```

```
Write-Output "Keycloak:          $KEYCLOAK_URL"
```

```
Write-Output "Keycloak Admin Console: $KEYCLOAK_URL/admin"
```

```
Write-Output "Keycloak Account Console: $KEYCLOAK_URL/realms/myrealm/account"
```

```
Write-Output ""
```