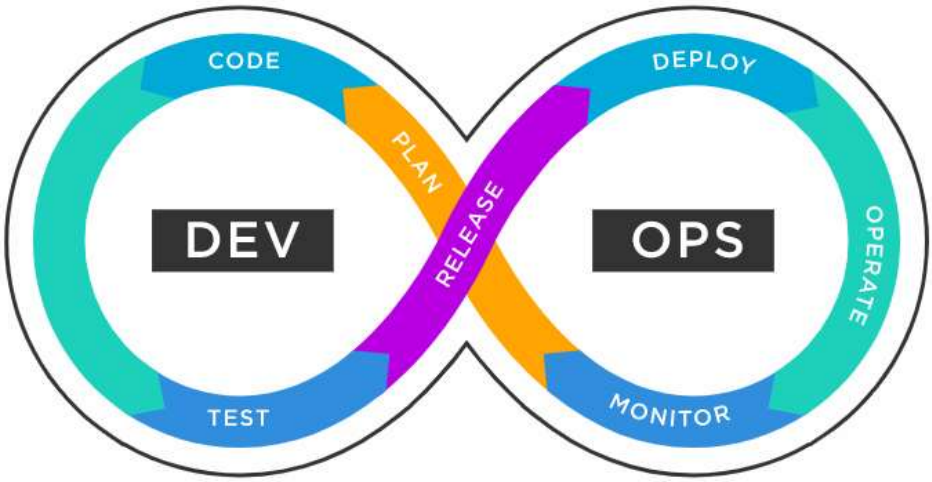
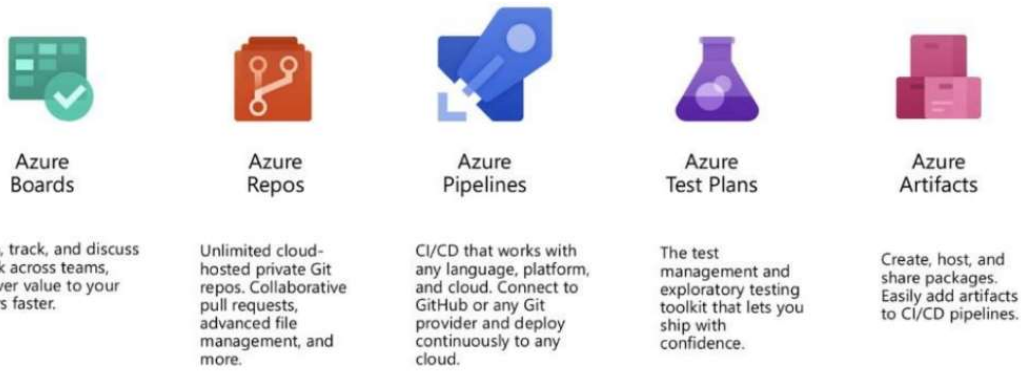
Azure – Devops

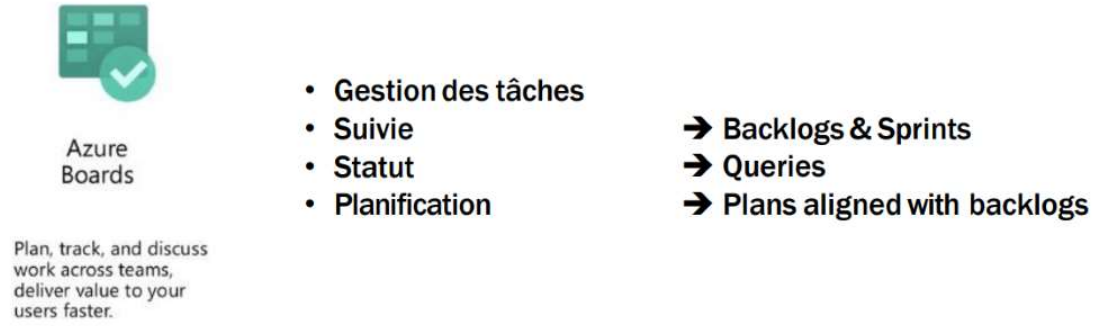
mardi 28 mars 2023 09:27



Formateur : Ihab ABADI

Outils DevOps de Microsoft :





Azure Repos

Unlimited cloud-hosted private Git repos. Collaborative pull requests, advanced file management, and more.

- Suivie des changements → Pushes and Branches
- Contrôle → Pull Requests
- → Documentation

Azure Pipeline


Azure Pipelines

CI/CD that works with any language, platform, and cloud. Connect to GitHub or any Git provider and deploy continuously to any cloud.

- Compile the app → Builds from the reposito
- Release the app → Releases
- Library → Manage variables or sec
- Task Group → Customize the pipeline
- Deployment gr. → Machines (Windows or L
- XAML → Old building model

Azure Test Plans

The test management and exploratory testing toolkit that lets you ship with confidence.

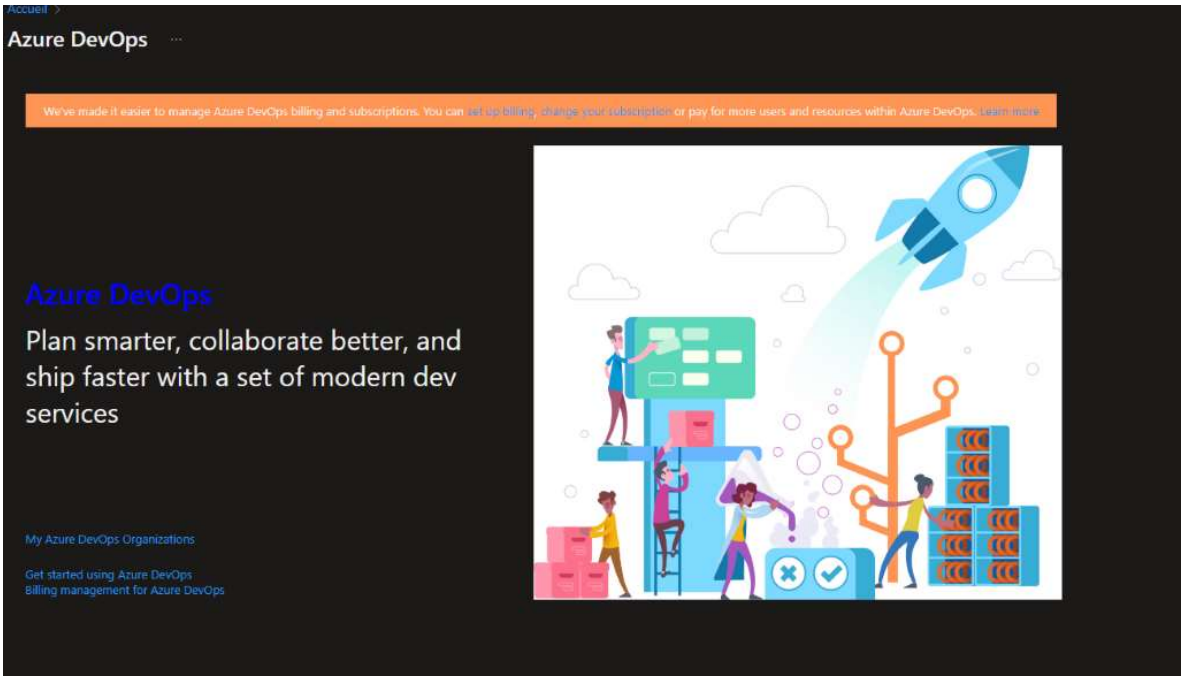
- Test Plans → Test Suites & Test Cases
- Parameters → Customize the test cases data
- Configurations → Different OS, browsers, i.e.
- Runs → Execute the tests
- Load test → Check responsiveness of the app

Azure Artifacts

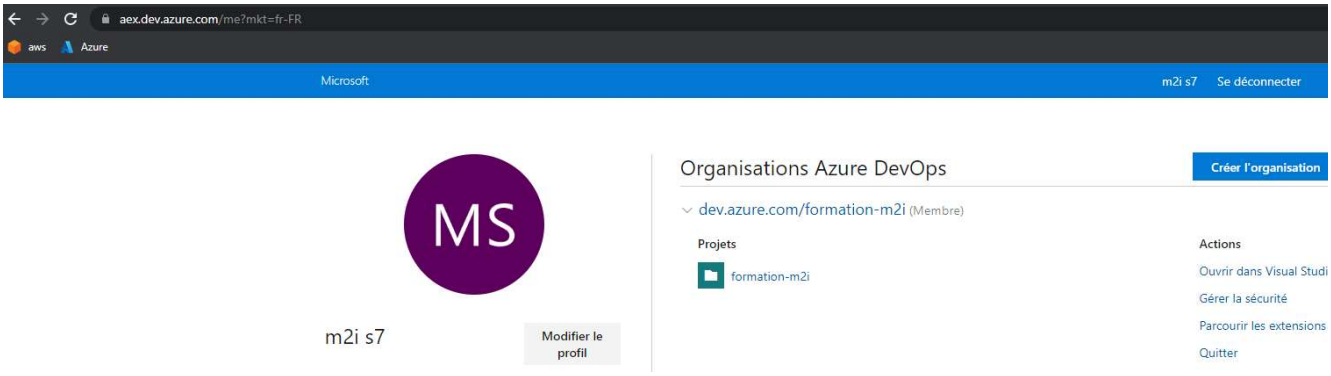
- Création de nos propres packages
- NuGet → .NET packages

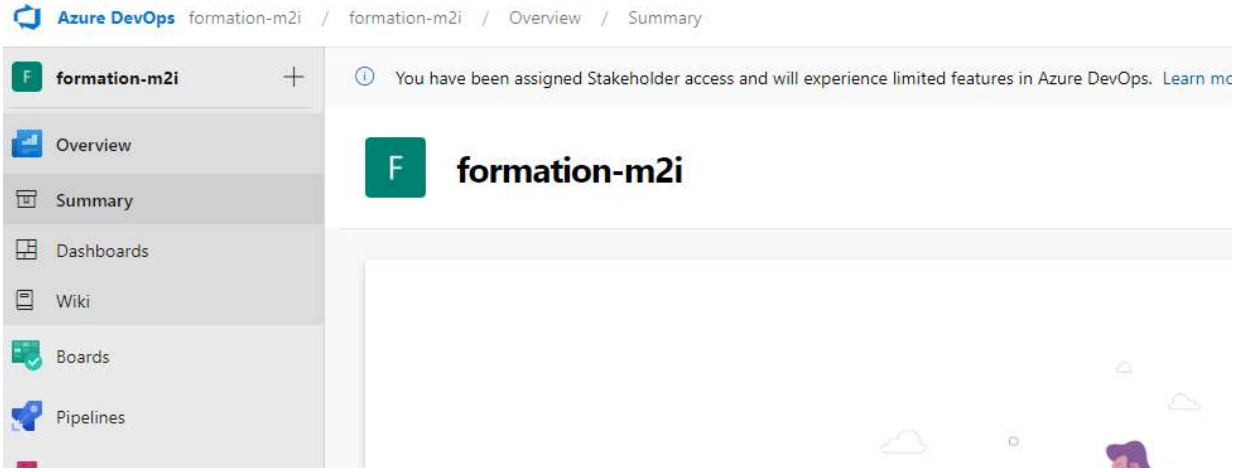
Create, host, and share packages. Easily add artifacts to CI/CD pipelines.

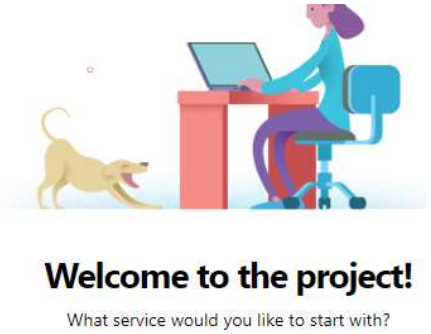
- npm → JavaScript packages
- Maven → Java packages
- Gradle → Java packages
- Universal → different packages



La plateforme azure devops se trouve à l'extérieur d'azure : https://aex.dev.azure.com/







Azure – Pipeline :

Application qui permet le Build / Test / Deploy

Azure pipelines

- Azure pipelines est un service qui, à partir d'un système de gestion de version (Github ou Azure repos), permet de :
  - Générer automatiquement les projets.
  - Tester automatiquement les projets.
  - Déployer automatiquement les projets.
- Azure pipelines combine L'intégration continue (CI) et le déploiement continue (CD).

Azure pipelines – Rappel Intégration continu

- L'intégration continue permet aux développeurs d'automatiser la fusion et le test du code.
- CI permet de détecter les problèmes et bugs au début du cycle de développement.
- CI produit les artifacts qui permettent la mise en production et un déploiement fréquent.

Azure pipelines – Rappel déploiement continue

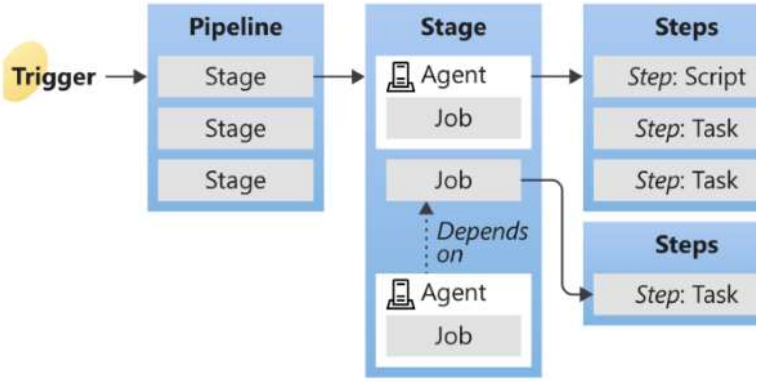
- Le déploiement continue permet de générer, tester et déployer nos applications sur un ou plusieurs environnements.
- Le déploiement continue consomme les artefacts produit par CI.
- Le déploiement continue permet d'améliorer la visibilité sur l'ensemble du processus à l'aide des systèmes de surveillance.

Azure pipelines – Langages pris en charge

- Azure pipelines permet la génération d'applications développées à partir d'un ensemble de technologies prisent en charge.
- Actuellement les langages prisent en charge sont :
  - C#
  - C++
  - JAVA
  - PHP
  - Javascript
  - Python
  - Ruby
  - Golang
- Azure devops utilise le mécanisme de tâche pour générer nos applications.

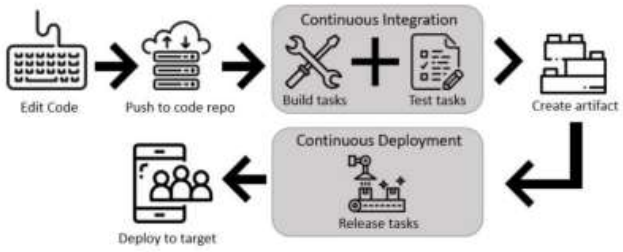
Azure pipelines – fonctionnement

- Azure pipelines démarre l'exécution à partir d'un déclencheur (un push sur un dépôt, un autre build...).
- Une pipeline est constitué d'un ou plusieurs stages.
- Une pipeline est déployé sur un ou plusieurs environnements.
- Les stages ont un ou plusieurs jobs.
- Un job est exécuté sur un agent et est constitué de steps.
- Chaque step est une tâche ou un script.
- Une tâche est un script pré-build qui effectue une action.



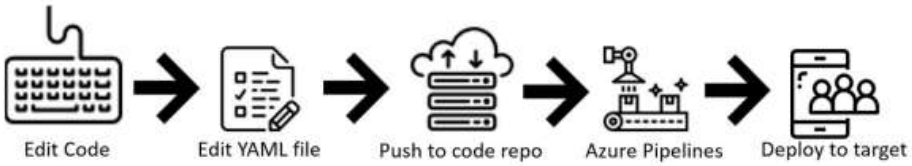
Azure pipelines – utilisation

- Azure pipeline fonctionne :
  - A partir de l'éditeur azure pipelines de l'interface web.

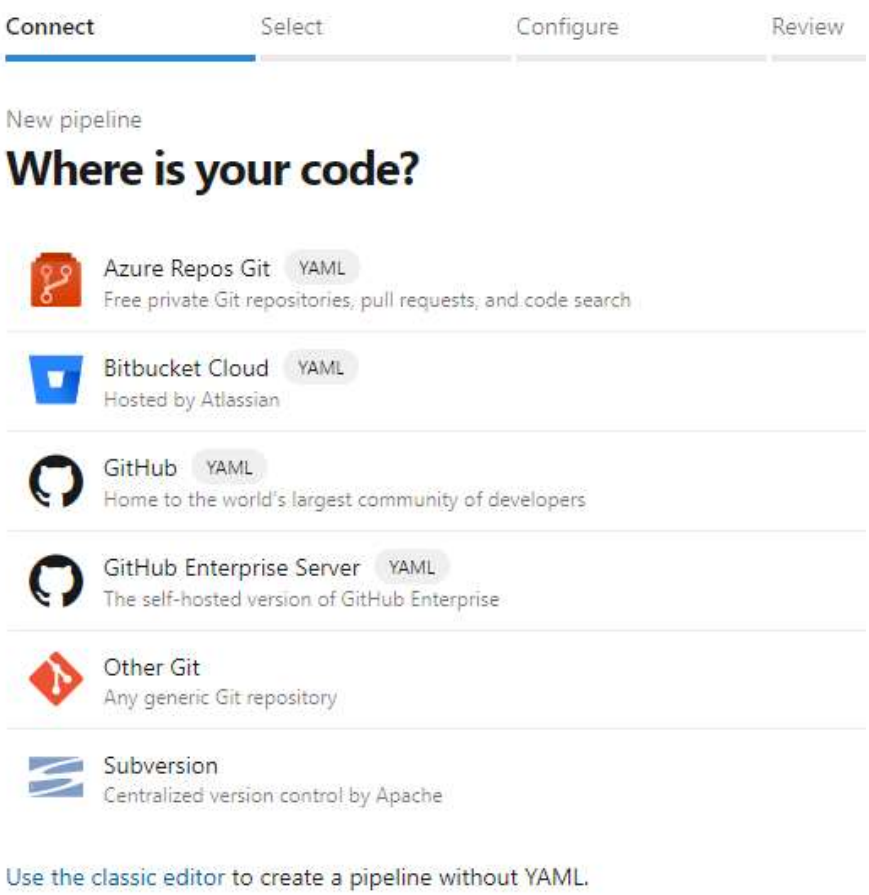


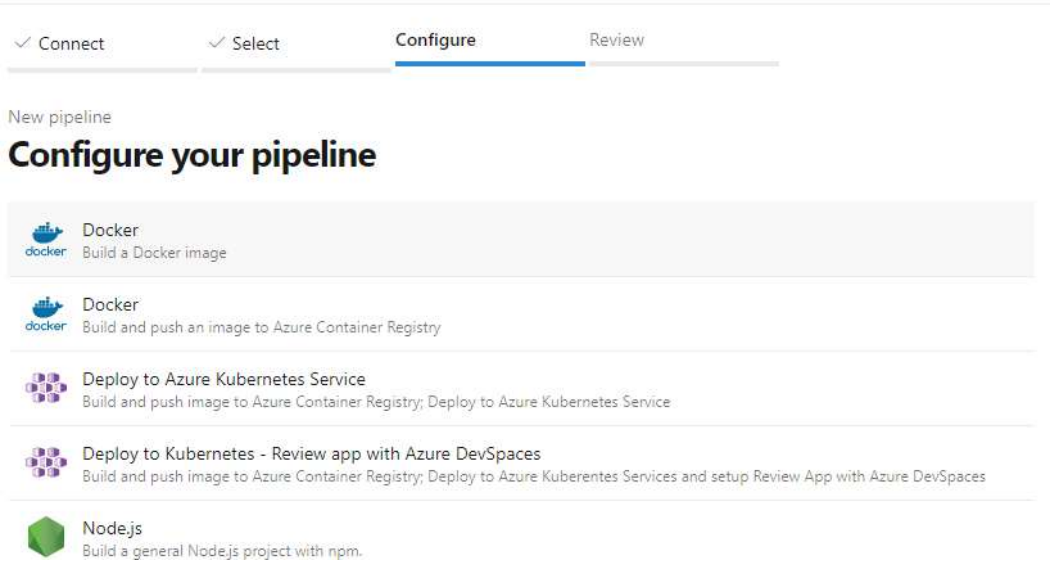
  - A partir d'un fichier YAML appelé azure-pipelines.yml

- A partir d'un fichier YAML appelé azure-pipelines.yml.
- Ce ficher est à placer à l'intérieur du gestionnaire de version de notre application (dépô



Création Pipeline :

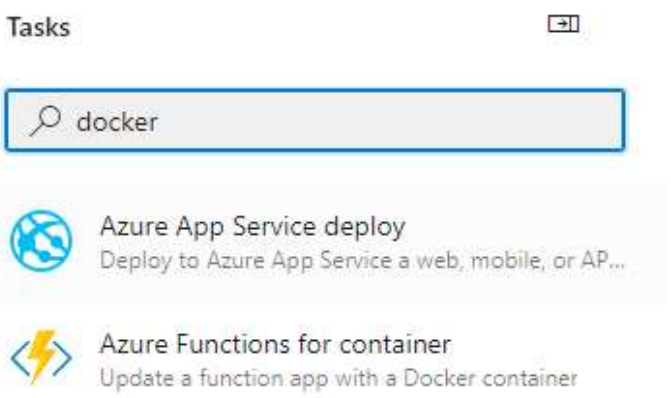




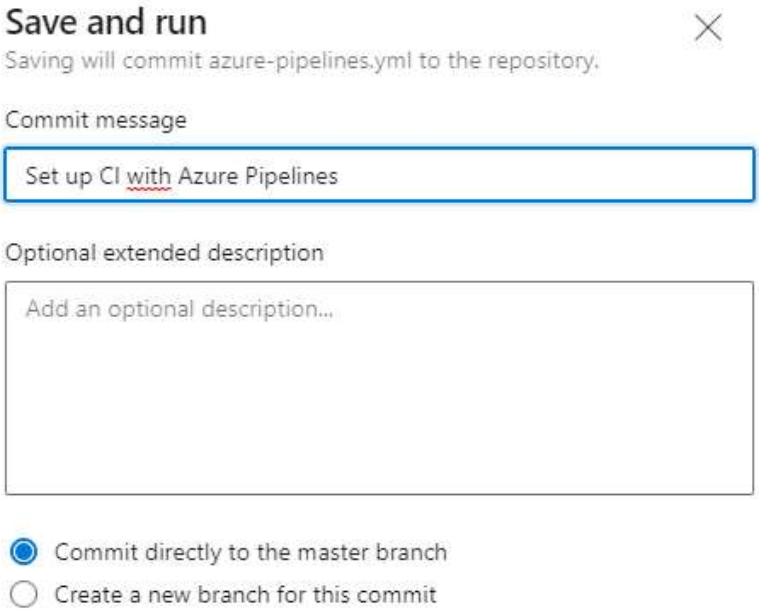
formation-m2i / azure-pipelines.yml *

```yaml
# Docker
# Build a Docker image
# https://docs.microsoft.com/azure/devops/pipelines/languages/docker

trigger:
- master

resources:
- repo: self

variables:
  tag: '$(Build.BuildId)'

stages:
- stage: Build
  displayName: Build image
  jobs:
  - job: Build
    displayName: Build
    pool:
      vmImage: ubuntu-latest
    steps:
    Settings
    - task: Docker@2
      displayName: Build an image
      inputs:
        command: build
        dockerfile: '$(Build.SourcesDirectory)/result/Dockerfile'
        tags: |
          $(tag)
```

Azure Pipeline propose un assistant pour créer directement les bloc YAML :



Exécuter le YAML :

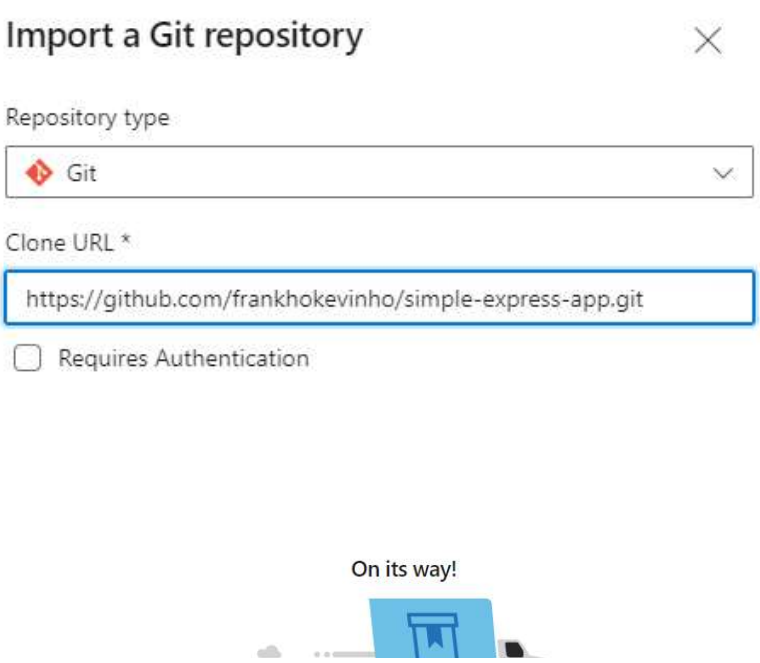


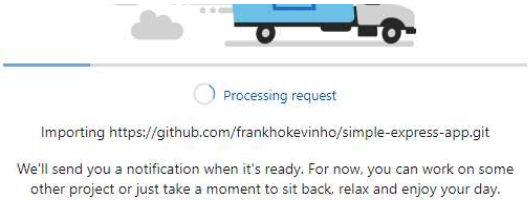
TP :

Exercice 1

L'objectif de cet exercice est de créer un pipeline de déploiement sur Azure DevOps qui permettra de déployer une application Node.js dans un environnement Azure.
L'adresse du dépôt : https://github.com/frankhokevinho/simple-express-app

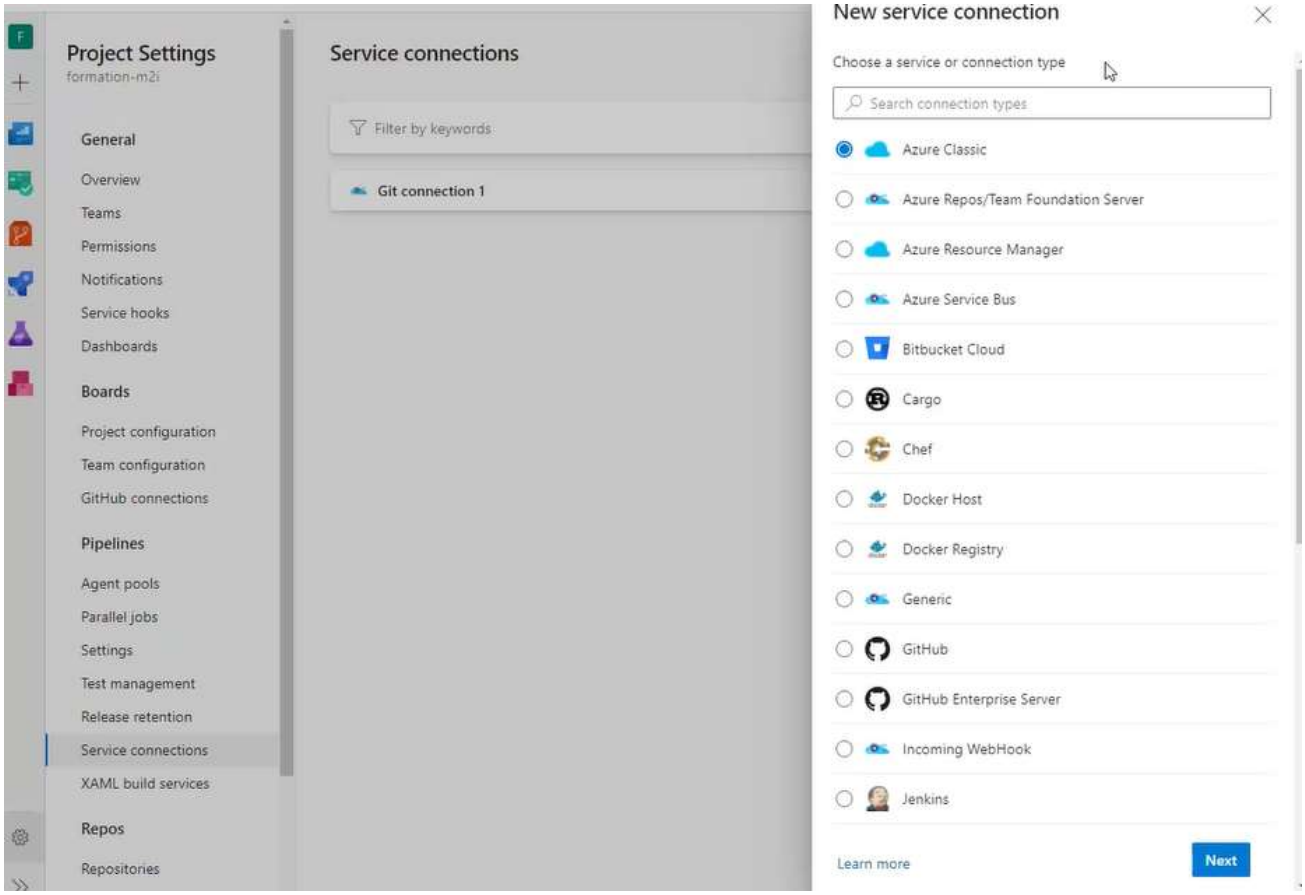
Import du repository :




Processing request
Importing https://github.com/frankhokevinho/simple-express-app.git
We'll send you a notification when it's ready. For now, you can work on some other project or just take a moment to sit back, relax and enjoy your day.

Correction :

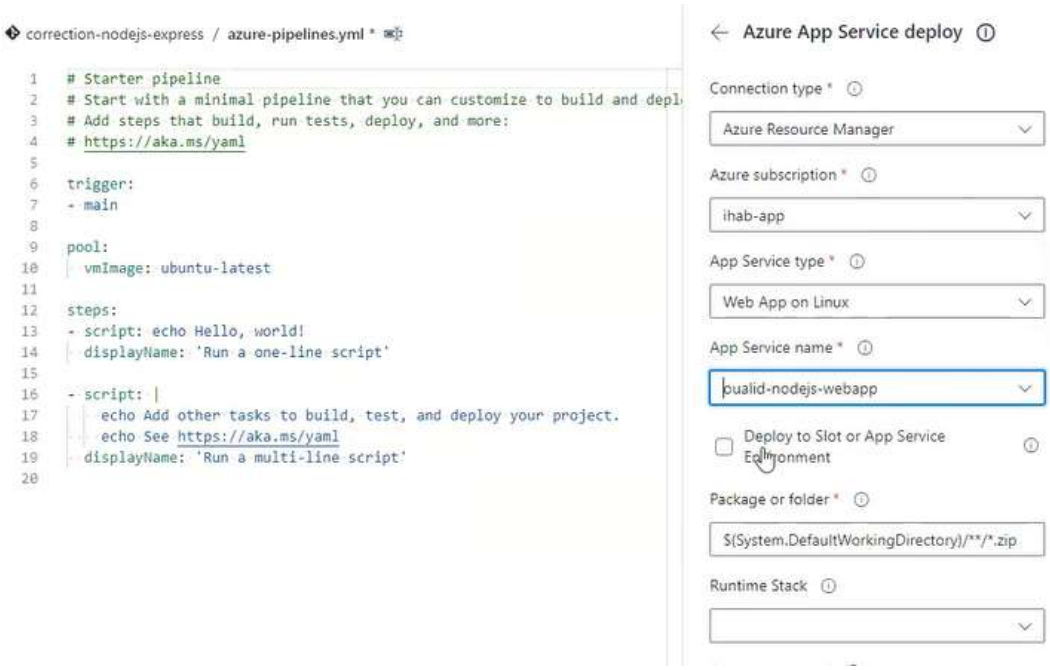

Node.js Express Web App to Linux on Azure
Build a Node.js Express app and deploy it to Azure as a Linux web app.
Web App name
No results found

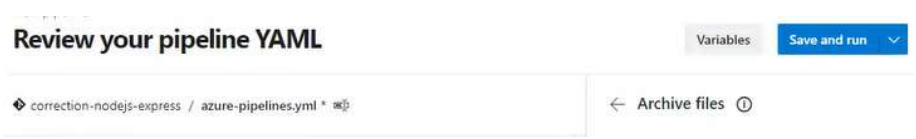

Project Settings
formation-m2i
General
Overview
Teams
Permissions
Notifications
Service hooks
Dashboards
Boards
Project configuration
Team configuration
GitHub connections
Pipelines
Agent pools
Parallel jobs
Settings
Test management
Release retention
Service connections
XAML build services
Repos
Repositories
Service connections
Filter by keywords
Git connection 1
New service connection
Choose a service or connection type
Search connection types
Azure Classic
Azure Repos/Team Foundation Server
Azure Resource Manager
Azure Service Bus
Bitbucket Cloud
Cargo
Chef
Docker Host
Docker Registry
Generic
GitHub
GitHub Enterprise Server
Incoming WebHook
Jenkins
Learn more
Next


New Azure service connection
Azure Resource Manager using service princip
Scope level
Subscription
Management Group

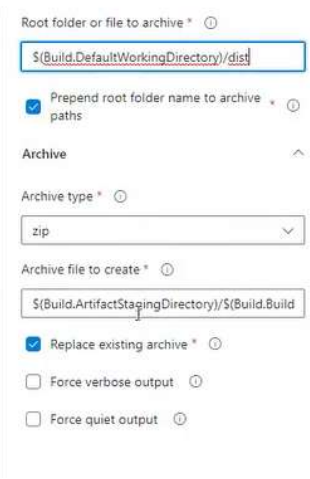
Code partagé par Ihab :

{
"subscriptionId": "c49e632f-5dd4-4c37-b1a6-578c7faa36fd",
"appId": "ac865e4d-92cd-43e9-a3ac-fb3e5dc483ef",
"displayName": "service-principal-aks",
"password": "Jv38Q~IKp-otYhUem.DVcL.UlsymJpW6CnWJccXO",
"tenant": "5016feea-b6ad-4017-aa7b-03ae57220502"
}

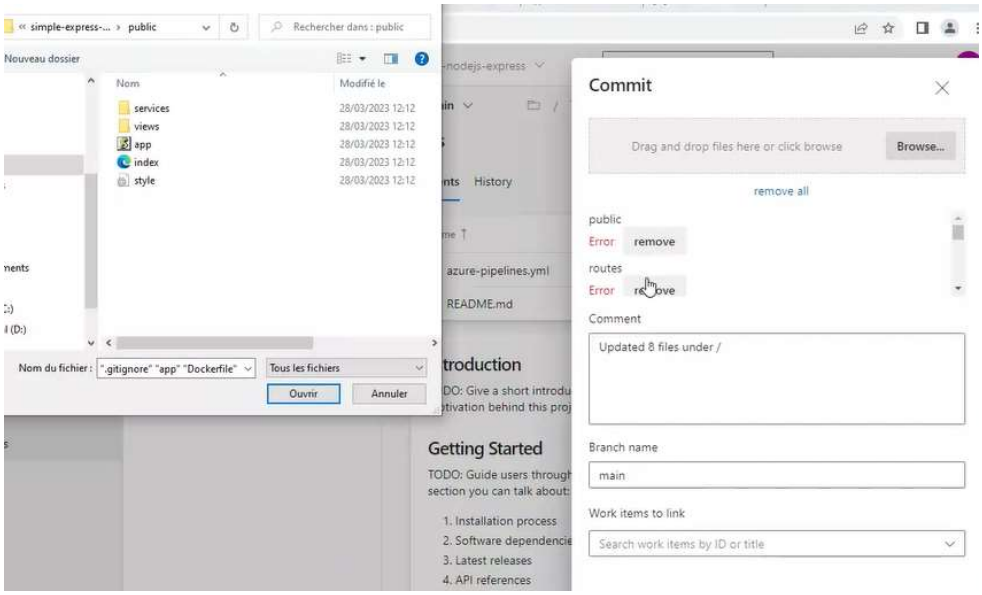




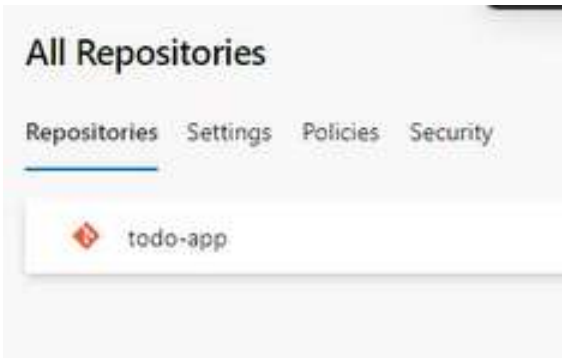
```yaml
pool:
  vmImage: ubuntu-latest

steps:
Settings
- task: NodeTool@0
  inputs:
    versionSpec: '14.x'
  displayName: install node

- script: |
    npm install
    npm run build
  displayName: build app


Settings
- task: AzureRmWebAppDeployment@4
  inputs:
    ConnectionType: 'AzureRM'
    azureSubscription: 'ihab-app'
    appType: 'webAppLinux'
    WebAppName: 'oualid-nodejs-webapp'
    packageForLinux: '$(System.DefaultWorkingDirectory)/**/*.zip'
```

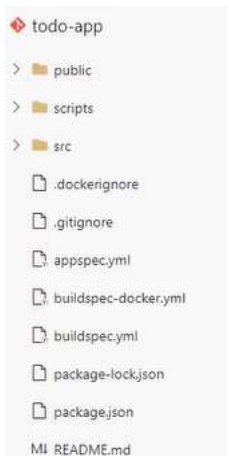


Rajout du code dans le dossier du code pipeline :

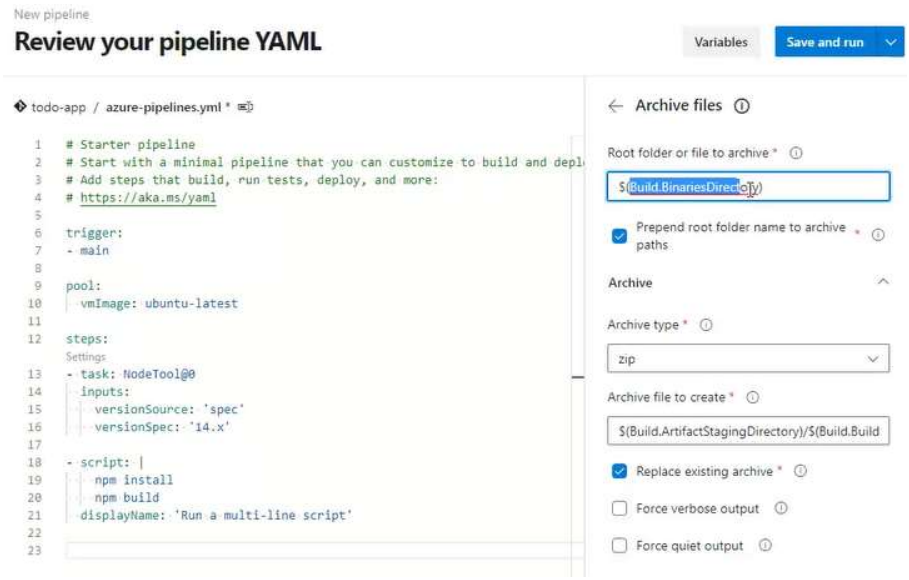


Autre exemple avec un projet Angular :

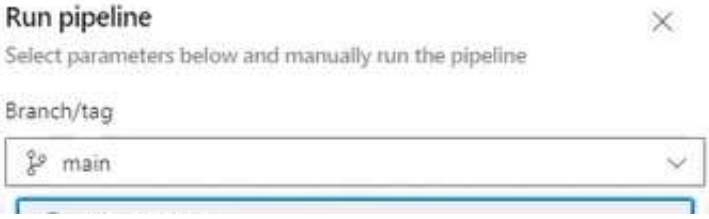


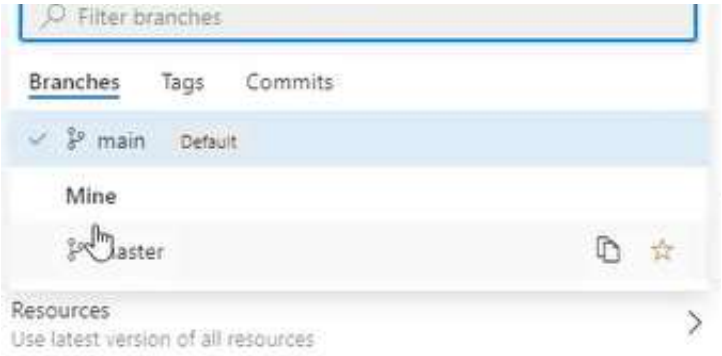


Création Pipeline :




```yaml
# Starter pipeline
# Start with a minimal pipeline that you can customize to build and depl
# Add steps that build, run tests, deploy, and more:
# https://aka.ms/yaml

trigger:
- master

pool:
  vmImage: ubuntu-latest

steps:
Settings
- task: NodeTool@0
  inputs:
    versionSource: 'spec'
    versionSpec: '14.x'

- script: |
    npm install
    npm build
  displayName: 'Run a multi-line script'

Settings
- task: ArchiveFiles@2
  inputs:
    rootFolderOrFile: '$(System.DefaultWorkingDirectory)/dist'
    includeRootFolder: true
    archiveType: 'zip'
    archiveFile: '$(Build.ArtifactStagingDirectory)/$(Build.BuildId).zip
    replaceExistingArchive: true
```

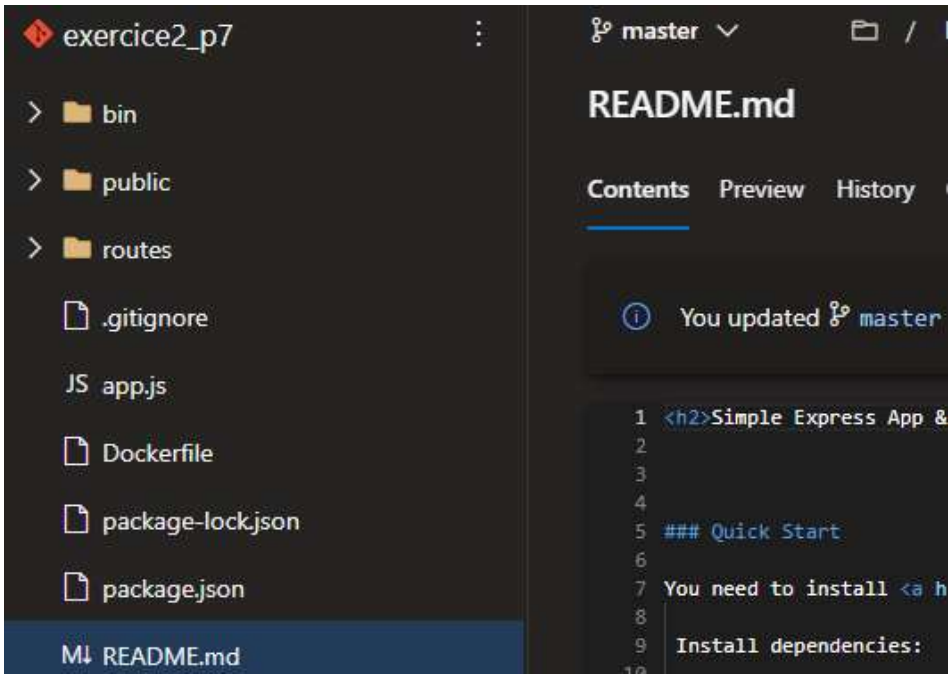


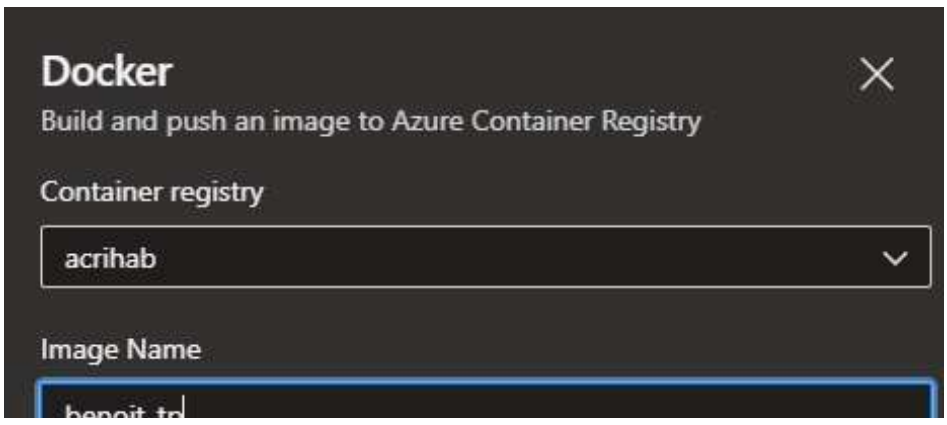


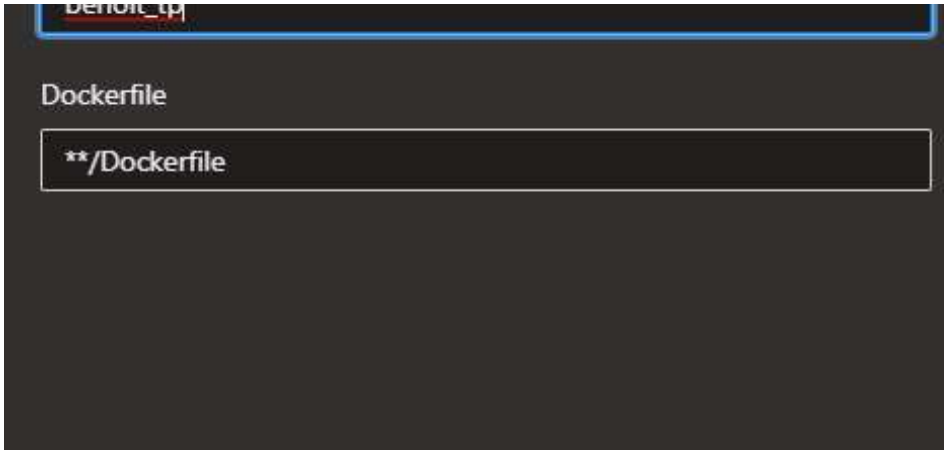
Exercice 2 :

Créer un nouveau repository + push le code

```
26  git clone https://github.com/frankhokevinho/simple-express-app.git
27  cd simple-express-app/
28  rm -rf .git
29  ls
30  git init
31  git remote add origin https://formation-m2i@dev.azure.com/formation-m2i/p7/_git/exercice2_p7
32  git status
33  git add .
34  git commit -m "tada !"
35  git push
36  git push -u origin master
```

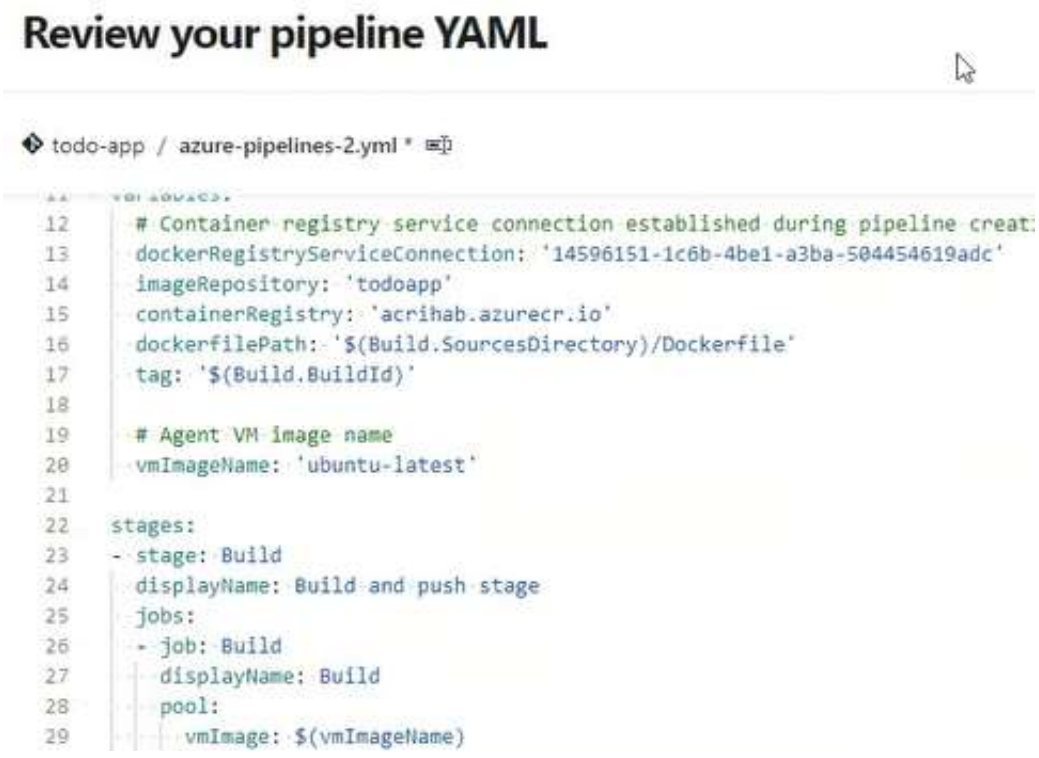






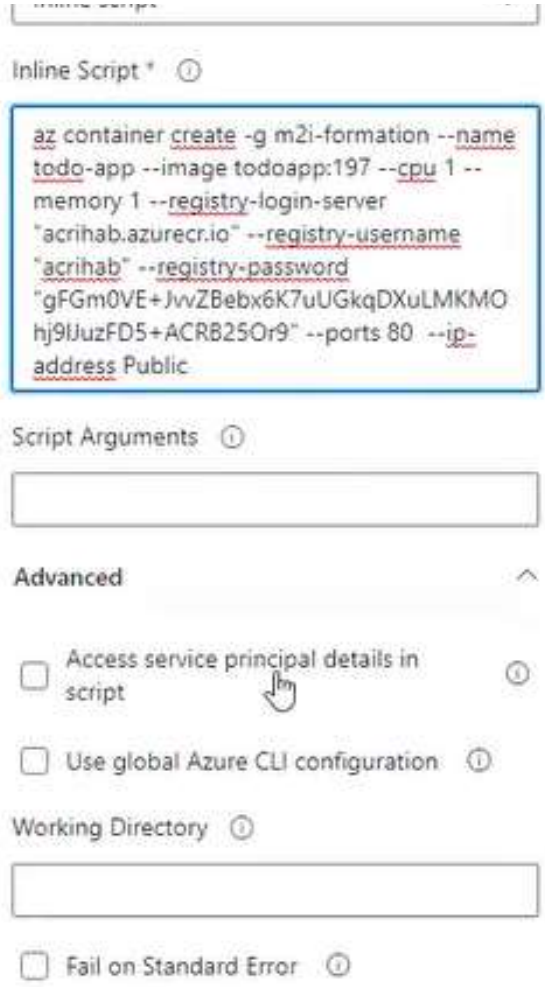
Correction :

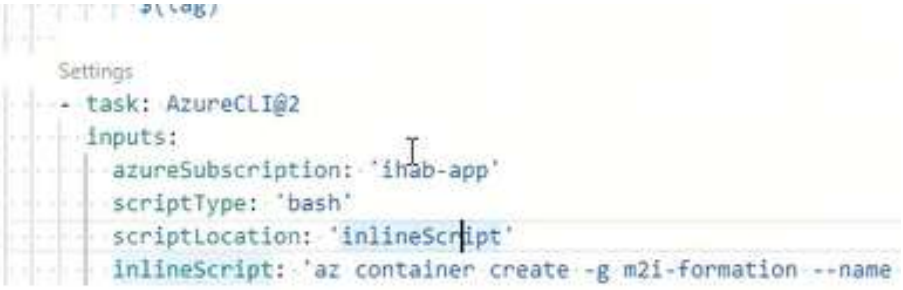
Script généré grâce au Dockerfiles :



```
30      steps:
        Settings
31      - task: Docker@2
32        displayName: Build and push an image to container registry
33        inputs:
34          command: buildAndPush
35          repository: $(imageRepository)
36          dockerfile: $(dockerfilePath)
37          containerRegistry: $(dockerRegistryServiceConnection)
38          tags: |
39            $(tag)
40
41
```

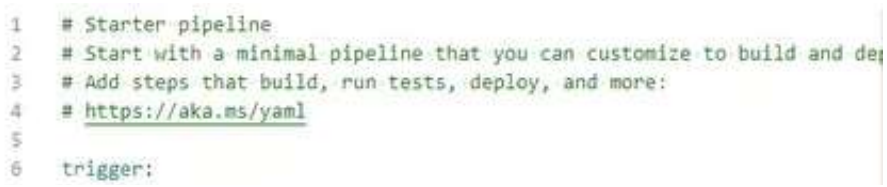
```yaml
# Docker
# Build and push an image to Azure Container Registry
# https://docs.microsoft.com/azure/devops/pipelines/languages/docker

trigger:
- main

resources:
- repo: self

variables:
  # Container registry service connection established during pipeline creation
  dockerRegistryServiceConnection: '14596151-1c6b-4be1-a3ba-504454619adc'
  imageRepository: 'todoapp'
  containerRegistry: 'acrihab.azurecr.io'
  dockerfilePath: '$(Build.SourcesDirectory)/Dockerfile'
  tag: '$(Build.BuildId)'

  # Agent VM image name
  vmImageName: 'ubuntu-latest'

stages:
- stage: Build
  displayName: Build and push stage
  jobs:
  - job: Build
    displayName: Build
    pool:
      vmImage: $(vmImageName)
    steps:
    - task: Docker@2
      displayName: Build and push an image to container registry
      inputs:
        command: buildAndPush
        repository: $(imageRepository)
        dockerfile: $(dockerfilePath)
        containerRegistry: $(dockerRegistryServiceConnection)
        tags: |
          $(tag)

    - task: AzureCLI@2
      inputs:
        azureSubscription: 'ihab-app'
        scriptType: 'bash'
        scriptLocation: 'inlineScript'
        inlineScript: 'az container create -g m2i-formation --name todo-app --image todoapp:199 --cpu 1 --memory 1 --registry-login-se
registry-username "acrihab" --registry-password "gFGm0VE+JvvZBebx6K7uUGkqDXuLMKMOhj9lJuzFD5+ACRB25Or9" --ports 80  --ip-address Public
```






```
    - task: AzureCLI@2
      inputs:
        azureSubscription: 'ihab-app'
        scriptType: 'bash'
        scriptLocation: 'inlineScript'
        inlineScript: 'az container create -g m2i-formation --name todo-app --image todoapp:199 --cpu 1 --memory 1 --registry-login-se
registry-username "acrihab" --registry-password "gFGm0VE+JvvZBebx6K7uUGkqDXuLMKMOhj9lJuzFD5+ACRB25Or9" --ports 80  --ip-address Public
```

On peut créer des dépendances entre les job (condition)



```yaml
- main

pool:
  vmImage: ubuntu-latest

jobs:
  - job: job1
    steps:
      - script: echo "je suis le job 1"
  - job: job2
    dependsOn: job1
    #condition: succeeded()
    condition: failed()
    steps:
      - script: echo "je suis le job 2"
```

Ici, l'option **dependsOn** permet de faire démarrer un job uniquement si le job précédent a démarré

On peut allez encore plus loin avec l'option **condition**

```yaml
# Starter pipeline
# Start with a minimal pipeline that you can customize to build and dep
# Add steps that build, run tests, deploy, and more:
# https://aka.ms/yaml

trigger:
- main

pool:
  vmImage: ubuntu-latest

jobs:
  - job: job1
    steps:
      - script: exit 1
  - job: job2
    dependsOn: job1
    #condition: succeeded()
    condition: and(failed(), eq(variables['Build.SourceBranch'], 'refs/
    steps:
      - script: echo "je suis le job 2"
```

main ▾ todo-app / azure-pipelines.yml *

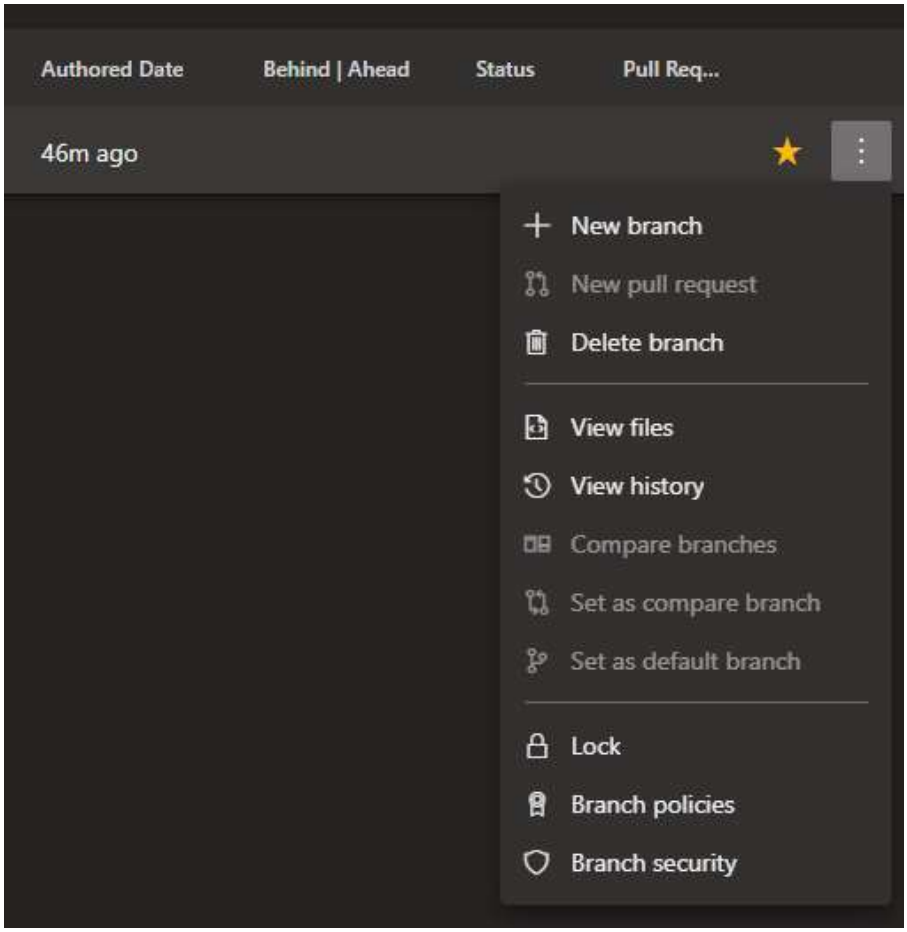
```yaml
# Starter pipeline
# Start with a minimal pipeline that you can customize to build and depl
# Add steps that build, run tests, deploy, and more:
# https://aka.ms/yaml

trigger:
- main

pool:
  vmImage: ubuntu-latest

jobs:
  - job: job1
    steps:
      - script: |
          #exit 1
          echo "##vso[task.setvariable variable=result;isOutput=true]1"
  - job: job2
    dependsOn: job1
    #condition: succeeded()
    #condition: and(failed(), eq(variables['Build.SourceBranch'], 'refs/
    condition: eq(dependencies.job1.outputs.result, 1)
```

```
23    steps:
24      - script: echo "je suis le job 2"
```

Si création de deux branche (main/master) à la création du projet -> voici des éléments de résolutions

- Tu renommes ta branche : git branch -m master main
- Si ton repo à distance est aussi sur une branche nommée master, change directement sur la plateforme (il y a un bouton défilant avec master, main...)
- Puis git push -u origin main / puis : git push origin --delete master

Changer la branche par défault dans le repository/menu branche/**set a default branche**



Correction exercice :

On déclare directement nos variables dans le pipeline

todo-app / azure-pipelines.yml *

```yaml
# Starter pipeline
# Start with a minimal pipeline that you can customize to build and deploy your code.
# Add steps that build, run tests, deploy, and more:
# https://aka.ms/yaml

trigger:
- main

pool:
  vmImage: ubuntu-latest

variables:
  - name: 'appName'
    value: 'todoapp'
  - name: 'buildDirectory'
    value: '$(workingDirectory)'
```

Jobs:
Tâche : installation Nodejs

```yaml
jobs:
  - job: build
    steps:
      Settings
      - task: NodeTool@0
        inputs:
          versionSpec: '14.x'
        displayName: Install nodejs
```

Tâche : installation des dépendances :

```yaml
Settings
- task: Npm@1
  inputs:
    command: 'install'
    workingDir: $(buildDirectory)
  displayName: Install des dépendances
```

Script : build de l'application :

```yaml
- script: |
    npm run build
  displayName: build app
```

Job test de l'application :

```yaml
- job: test
  dependsOn: build
  condition: succeeded()
  # #condition: and(failed(), eq(variables['Build.SourceBranch'], 'refs/heads/master'))
  # condition: eq(dependencies.job1.outputs['job1step1.result'], 1)
  steps:
    - script: echo "je suis le job 2"
```

Job deploiement de l'application :

```yaml
- job: deploy
  dependsOn: test
  steps:
    Settings
    - task: ArchiveFiles@2
      inputs:
        rootFolderOrFile: '$(buildDirectory)'
        includeRootFolder: true
        archiveType: 'zip'
        archiveFile: '$(Build.ArtifactStagingDirectory)/$(Build.Build
        replaceExistingArchive: true
      displayName: Création du zip
```

Task :

```yaml
Settings
- task: AzureRmWebAppDeployment@4
  inputs:
    ConnectionType: 'AzureRM'
    azureSubscription: 'ihab-app'
    appType: 'webAppLinux'
    WebAppName: '$(appName)'
    packageForLinux: '$(Build.ArtifactStagingDirectory)/$(Build.BuildId).zip'
    SlotName: "production"
  condition: and(succeeded(), eq(variables['Build.SourceBranch'], 'refs/pull/$(System.PullRequest.PullRequestId)/merge'))
  displayName: deploy test
```

Code utilisé :

```yaml
# Starter pipeline
# Start with a minimal pipeline that you can customize to build and deploy your code.
# Add steps that build, run tests, deploy, and more:
# https://aka.ms/yaml


trigger:
- main


pool:
  vmImage: ubuntu-latest


variables:
  - name: 'appName'
    value: 'todoapp'
  - name: 'buildDirectory'
    value: '$(workingDirectory)'



jobs:
  - job: build
    steps:
      - task: NodeTool@0
        inputs:
          versionSpec: '14.x'
        displayName: Install nodejs

      - task: Npm@1
        inputs:
          command: 'install'
          workingDir: $(buildDirectory)
        displayName: Install des dépendances

      # - task: Npm@1
      #   inputs:
      #     command: 'custom'
      #     customCommand: 'run build'
      #     workingDir: $(buildDirectory)
      #   displayName: Install des dépendances


      - script: |
          npm run build
        displayName: build app


  - job: test
    dependsOn: build
    condition: succeeded()
    # #condition: and(failed(), eq(variables['Build.SourceBranch'], 'refs/heads/master'))
    # condition: eq(dependencies.job1.outputs['job1step1.result'], 1)
    steps:
      - task: Npm@1
        inputs:
          command: 'custom'
          customCommand: 'run test'
          workingDir: $(buildDirectory)
        displayName: Install des dépendances

  - job: deploy
    dependsOn: test
    steps:
      - task: ArchiveFiles@2
        inputs:
          rootFolderOrFile: '$(buildDirectory)/public'
          includeRootFolder: true
          archiveType: 'zip'
          archiveFile: '$(Build.ArtifactStagingDirectory)/$(Build.BuildId).zip'
          replaceExistingArchive: true
        displayName: Création du zip


      - task: AzureRmWebAppDeployment@4
        inputs:
          ConnectionType: 'AzureRM'
```

```yaml
      azureSubscription: 'ihab-app'
      appType: 'webAppLinux'
      WebAppName: '$(appName)'
      packageForLinux: '$(Build.ArtifactStagingDirectory)/$(Build.BuildId).zip'
      SlotName: "production"
    condition: and(succeeded(), eq(variables['Build.SourceBranch'], 'refs/heads/main'))
    displayName: deploy prod

  - task: AzureRmWebAppDeployment@4
    inputs:
      ConnectionType: 'AzureRM'
      azureSubscription: 'ihab-app'
      appType: 'webAppLinux'
      WebAppName: '$(appName)'
      packageForLinux: '$(Build.ArtifactStagingDirectory)/$(Build.BuildId).zip'
      SlotName: "production"
    condition: and(succeeded(), eq(variables['Build.SourceBranch'], 'refs/pull/$(System.PullRequest.PullRequestId)/merge'))
    displayName: deploy test
```

Exercice 4

Vous devez créer un pipeline Azure qui permet de construire et tester une image Docker, puis la déployer dans Azure Container Registry (ACR) et Azure Kubernetes Service (AKS). Le pipeline doit être configuré pour exécuter les étapes suivantes :

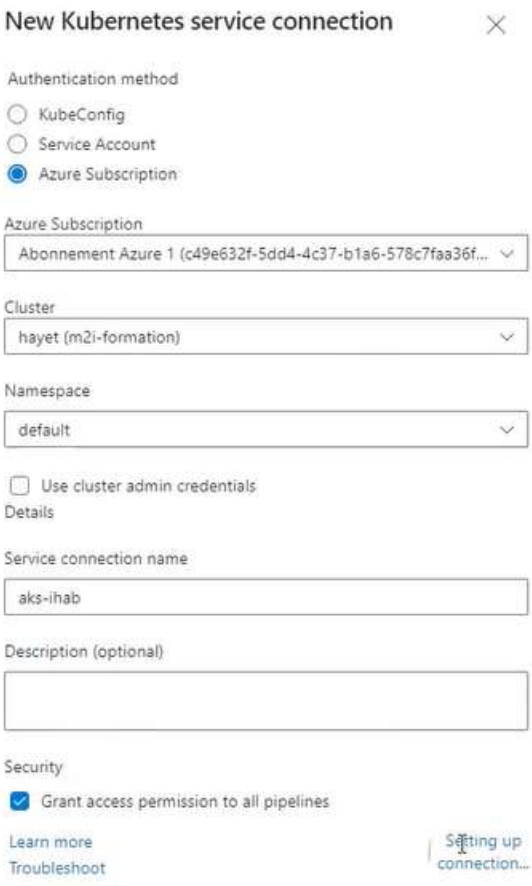
- Récupérer le code source de l'application à partir d'un référentiel Git.
- Construire une image Docker à partir de l'application.
- Exécuter les tests de l'application.
- Si les tests réussissent, déployer l'image Docker dans Azure Container Registry (ACR).
- Déployer l'image Docker depuis ACR dans Azure Kubernetes Service (AKS).

Assurez-vous que le pipeline ne déploie l'image Docker que si toutes les étapes précédentes ont réussi.

Correction :

Deux possibilité pour les test : build l'image et faire les test / faire les test et déployer

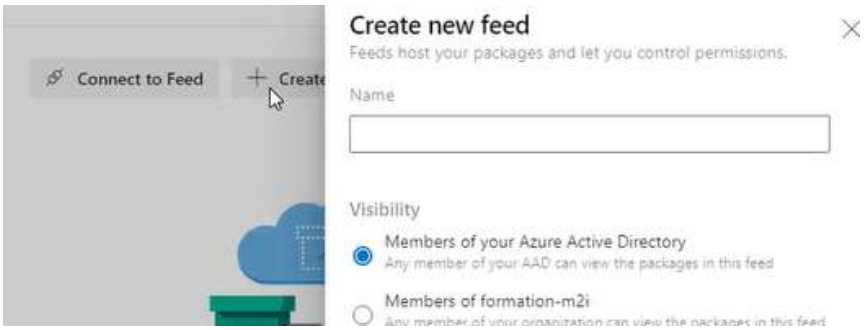
Ne pas oublier la connexion des services : (ACR et AKS)

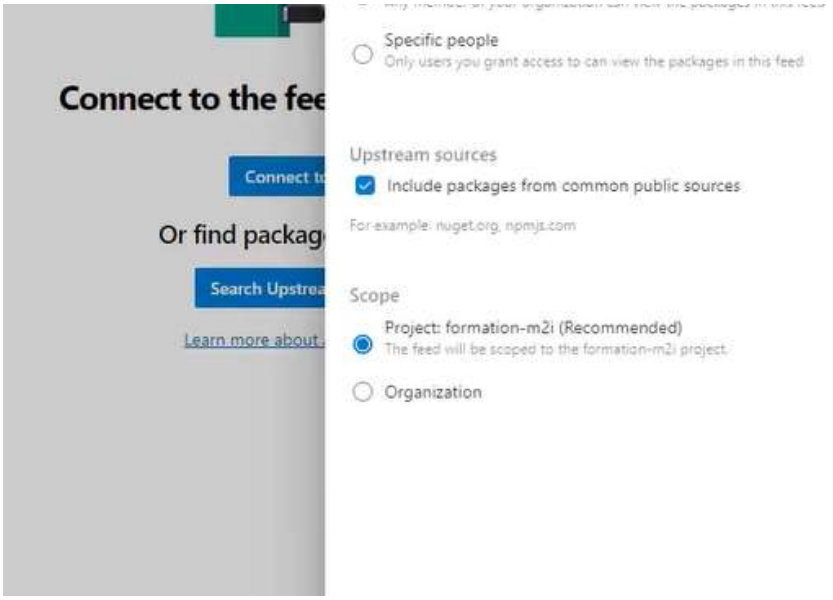


```yaml
# Starter pipeline
# Start with a minimal pipeline that you can customize to build and deploy your code.
# Add steps that build, run tests, deploy, and more:
# https://aka.ms/yaml


trigger:
- main


pool:
  vmImage: ubuntu-latest


variables:
  - name: 'appName'
    value: 'todoapp'
  - name: 'buildDirectory'
    value: '$(workingDirectory)'



jobs:
  - job: build
    steps:
      - task: Docker@2
        inputs:
          containerRegistry: 'acrihab'
          repository: 'image-app'
          command: 'buildAndPush'
          Dockerfile: '**/Dockerfile'
        displayName: build image app



  - job: test
    dependsOn: build
    condition: succeeded()
    # #condition: and(failed(), eq(variables['Build.SourceBranch'], 'refs/heads/master'))
    # condition: eq(dependencies.job1.outputs['job1step1.result'], 1)
    steps:
      - task: Docker@2
        inputs:
          containerRegistry: 'acrihab'
          command: 'start'
          arguments: 'npm run test'
          Dockerfile: '**/Dockerfile'



  - job: deploy
    dependsOn: test
    steps:
      - task: KubernetesManifest@0
        inputs:
          action: 'deploy'
          kubernetesServiceConnection: 'ihab-aks'
          manifests: 'deploy.yml'
```

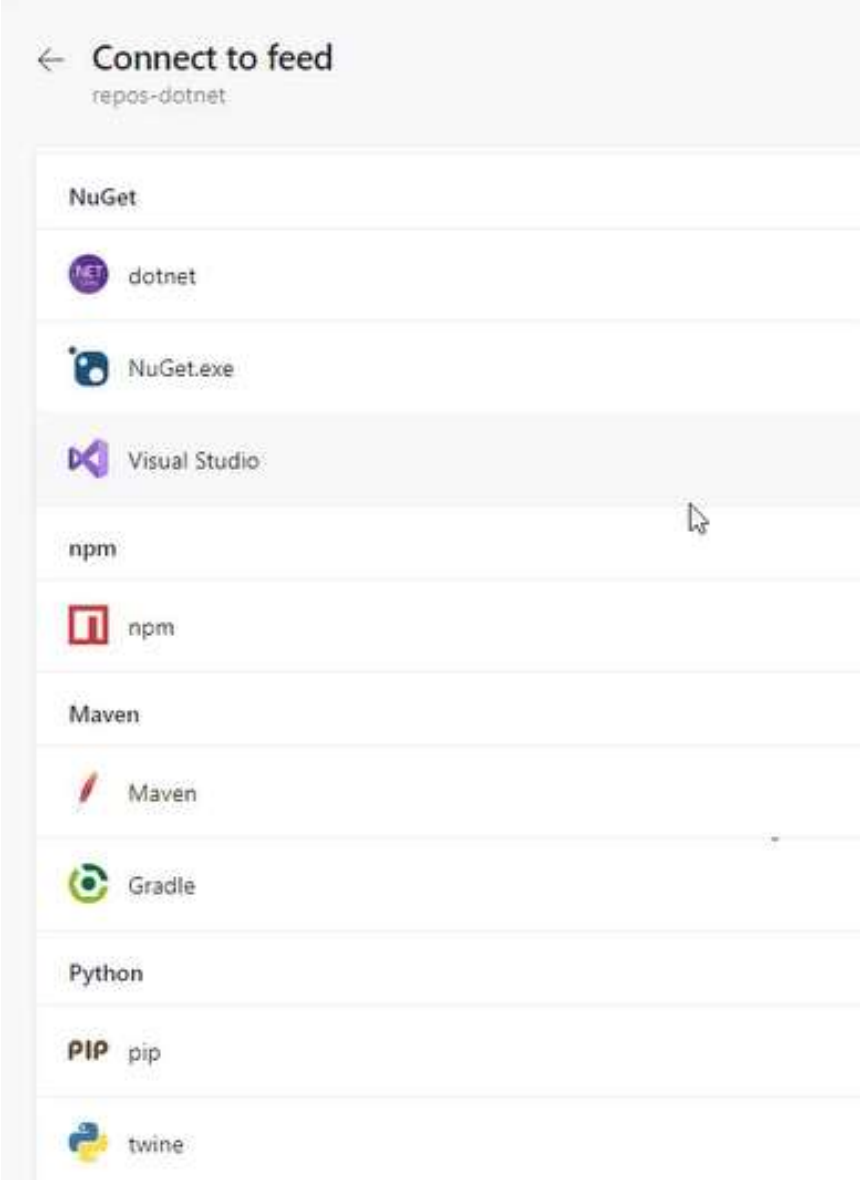
Déployer Pipeline à Artifact :

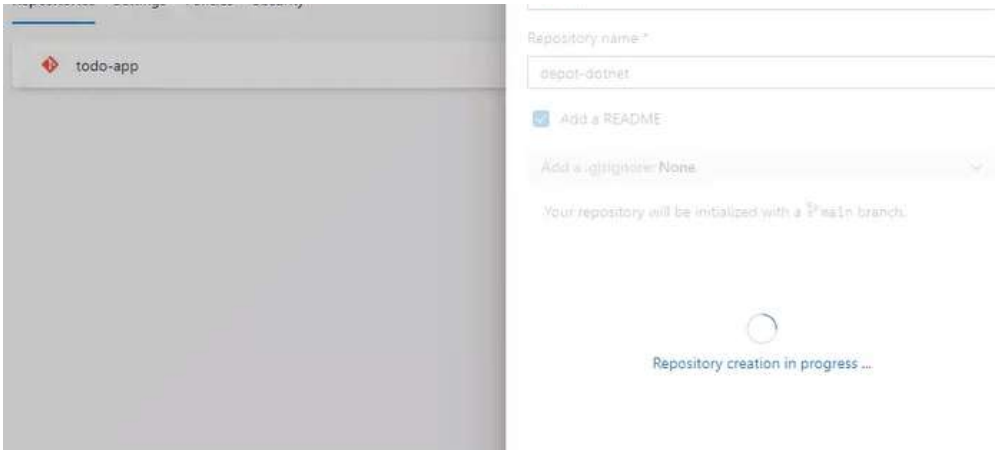
Création d'un feed :



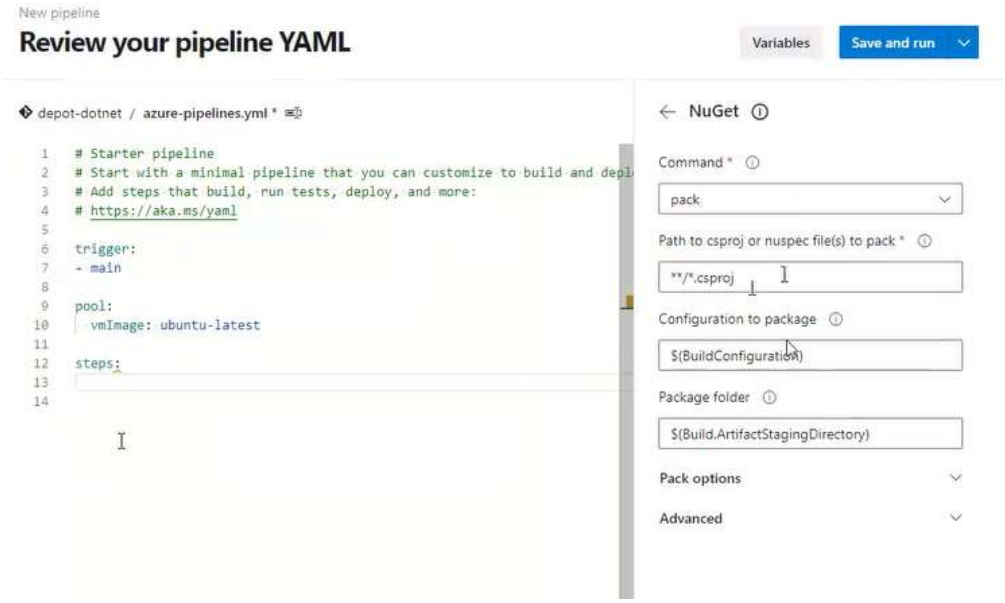


Sélection techno'

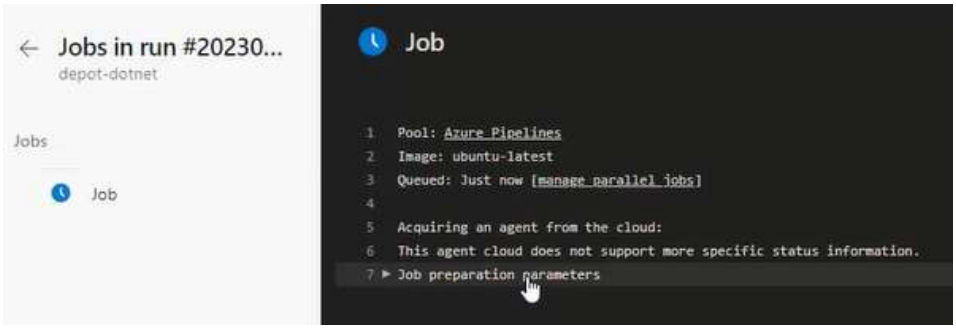




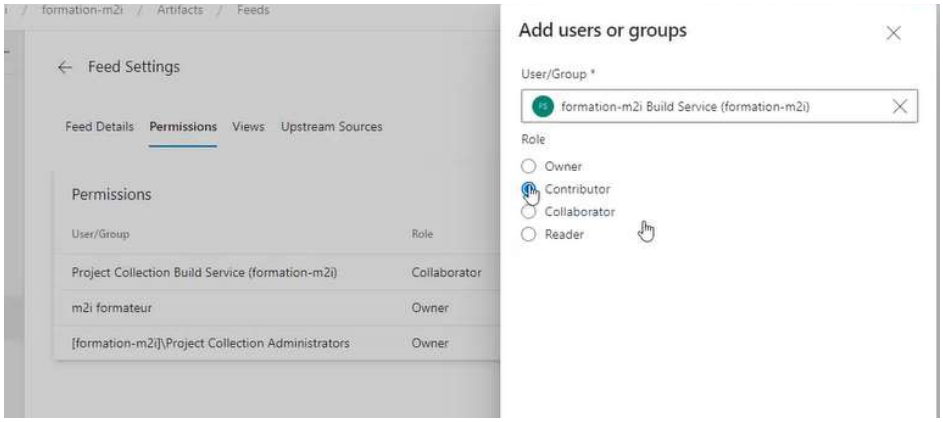
Review du pipeline :



Run du job :



Ne pas oublier de rajouter les droits sur le pipeline :



TP :

La Partie CI/CD

- Vous aurez besoin de mettre en place les services azure devops suivants :
  - Azure repos
  - Azure pipeline
- A chaque fois qu'un commit sera pushé sur la branche main sur azure repos, azure pipeline se chargera de générer une nouvelle image. Cette nouvelle image sera stockée dans ACR.
- Elle viendra ensuite être mise à jour dans votre cluster.
- A chaque fois qu'une branche est mise à jour, le chef de projet recevra une notification.
- Il faudra partir du principe que chacun des microservices sera géré par une équipe différente (Developpeur).
- Le projet est pleinement fonctionnel lorsque vous allez effectuer une modification sur le titre de la page du projet dans le header en passant « Online Boutique » à « M2i Boutique ».
- Cette modification sera prise en compte de manière automatique par votre système juste après avoir mis à jour le micro-service sur azure repos.