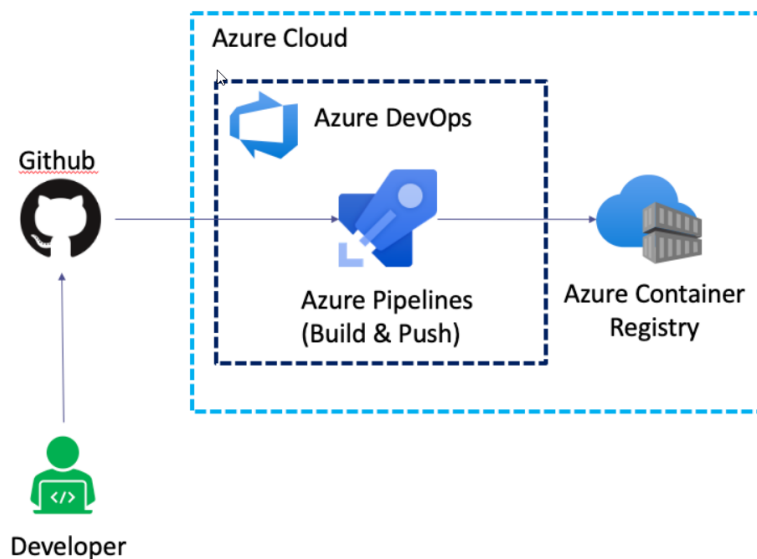


# Build Docker Image and Push to Azure container Registry

## Azure DevOps Pipelines – Build & Push Docker Image to ACR



## Step-02: Create Github Project and Check-In Code

### Create Github Repo in Github

- Name: azure-devops-github-acr-aks-app1
- Description: Azure DevOps App1 Demo with AKS, Github and Azure Containter Registry
- Repo Type: Public / Private (Your choice)
- Click on Create Repository

### Create Local Git Repo and Check-In Code

- Create Local folders

```
# Create a folder for all Repos we are going to create
mkdir azure-devops-aks-demo-repos
cd azure-devops-aks-demo-repos
```

```
# Create a Directory for Repo
mkdir azure-devops-github-acr-aks-app1
cd azure-devops-github-acr-aks-app1
```

```
C:\Users\Billa\Desktop\VisualCode-Apps\azure-devops-github-acr-aks-app1>dir
Volume in drive C has no label.
Volume Serial Number is 3EF1-9EAF

Directory of C:\Users\Billa\Desktop\VisualCode-Apps\azure-devops-github-acr-aks-app1

09/03/2022  01:22    <DIR>          .
09/03/2022  01:22    <DIR>          ..
08/03/2022  18:38                48 Dockerfile
08/03/2022  18:38               240 index.html
09/03/2022  01:22    <DIR>          kube-manifests
                2 File(s)                288 bytes
                3 Dir(s)  16,249,147,392 bytes free

C:\Users\Billa\Desktop\VisualCode-Apps\azure-devops-github-acr-aks-app1>
```

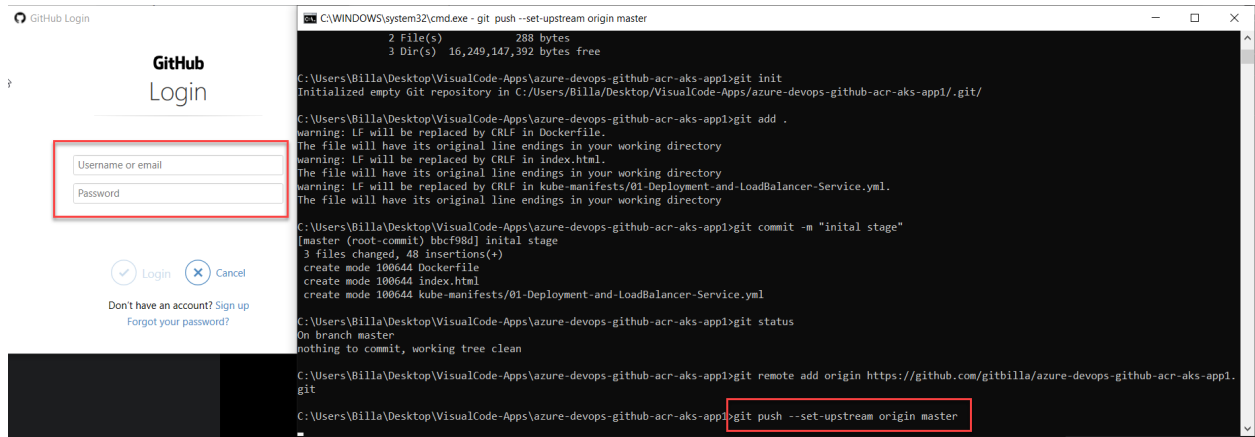
```
C:\Users\Billa\Desktop\VisualCode-Apps\azure-devops-github-acr-aks-app1>git init
Initialized empty Git repository in C:/Users/Billa/Desktop/VisualCode-Apps/azure-devops-github-acr-aks-app1/.git/

C:\Users\Billa\Desktop\VisualCode-Apps\azure-devops-github-acr-aks-app1>git add .
warning: LF will be replaced by CRLF in Dockerfile.
The file will have its original line endings in your working directory
warning: LF will be replaced by CRLF in index.html.
The file will have its original line endings in your working directory
warning: LF will be replaced by CRLF in kube-manifests/01-Deployment-and-LoadBalancer-Service.yml.
The file will have its original line endings in your working directory

C:\Users\Billa\Desktop\VisualCode-Apps\azure-devops-github-acr-aks-app1>git commit -m "inital stage"
[master (root-commit) bbcf98d] inital stage
3 files changed, 48 insertions(+)
create mode 100644 Dockerfile
create mode 100644 index.html
create mode 100644 kube-manifests/01-Deployment-and-LoadBalancer-Service.yml

C:\Users\Billa\Desktop\VisualCode-Apps\azure-devops-github-acr-aks-app1>git status
On branch master
nothing to commit, working tree clean

C:\Users\Billa\Desktop\VisualCode-Apps\azure-devops-github-acr-aks-app1>
```



- Copy all files from Giti-Repository-files folder to our new repo folder  
azure-devops-github-acr-aks-appl

```
# Initialize Git Repo
```

```
cd azure-devops-github-acr-aks-appl
```

```
git init
```

```
# Do local Commit
```

```
echo "# Azure DevOps Appl Demo with AKS, Github and ACR" >> README.md
```

```
git add .
```

```
git commit -am "V1 Base Commit"
```

```
# Link Github Remote Repository
```

```
git remote add origin
```

```
https://github.com/gitbilla/azure-devops-github-acr-aks-appl.git
```

```
# Push to Remote Repository
```

```
git push --set-upstream origin master
```

```
# Go to Github Repo - Refresh and check files appeared in github repo
```

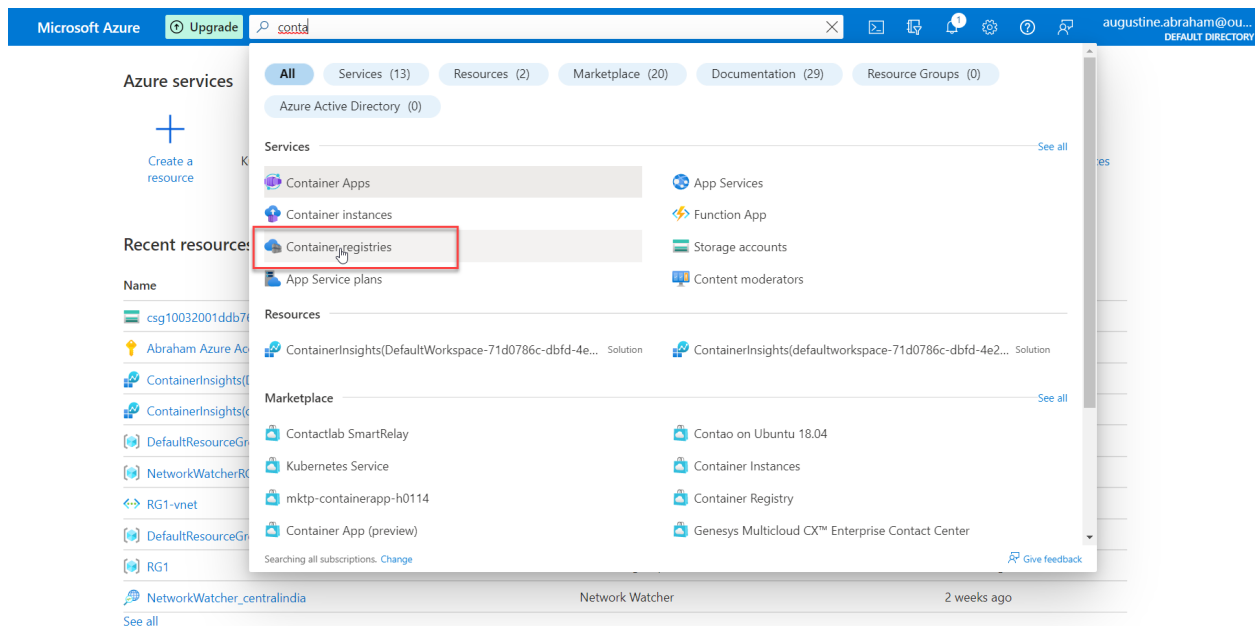
```
https://github.com/gitbilla/azure-devops-github-acr-aks-appl.git
```

## Step-03: Review github checked-in files

- kube-manifests
- Dockerfile
- index.html

## Step-04: Create Azure Container Registry ACR

- Go to Services -> Container Registries
- Click on Add
- Subscription: Abraham Azure Account
- Resource Group: Abram-RG1
- Registry Name: Billaaksdevopsacr
- Location: Central US
- SKU: Basic Click on Review + Create
- Click on Create





## Create container registry ...

pipelines. Use Azure Container Registry tasks to build container images in Azure On-Demand, or automate builds triggered by source code updates, updates to a container's base image, or timers. [Learn more](#)

### Project details

Subscription \*

Abraham Azure Account

Resource group \*

(New) Abram-RG1

[Create new](#)

### Instance details

Registry name \*

Billaaksdevopsacr

.azurecr.io

Location \*

Central US

Availability zones ⓘ

☐ Enabled

ⓘ Availability zones are enabled on premium registries and in regions that support availability zones. [Learn more](#)

SKU \* ⓘ

Basic

[Review + create](#)

[< Previous](#)

[Next: Networking >](#)

## Step-05: Creat DevOps Organization

- Go to
  - <https://dev.azure.com/>
  - Sign in to Azure DevOps
- Our Organization will be automatically created and if you want to manually create an organization you can create one.
- Organization Name: AbramDevops

A abrahambilla

New organization

## abrahambilla

Projects My work items My pull requests



**Abram-Pipeline**  
Abram-Pipeline



**AbramWebApps**





Azure DevOps

augustine.abraham@outlook.com [Switch directory](#)

## Almost done...

Name your Azure DevOps organization

dev.azure.com/ AbramDevops

We'll host your projects in

Central US



- ☐ I would like information, tips, and offers about Azure DevOps and other Microsoft products and services. [Privacy Statement](#).

Enter the characters you see

[New](#) | [Audio](#)

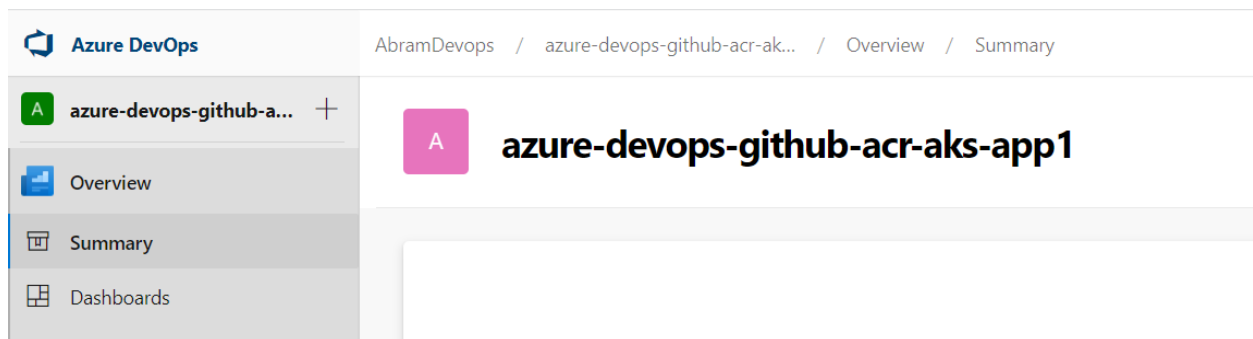
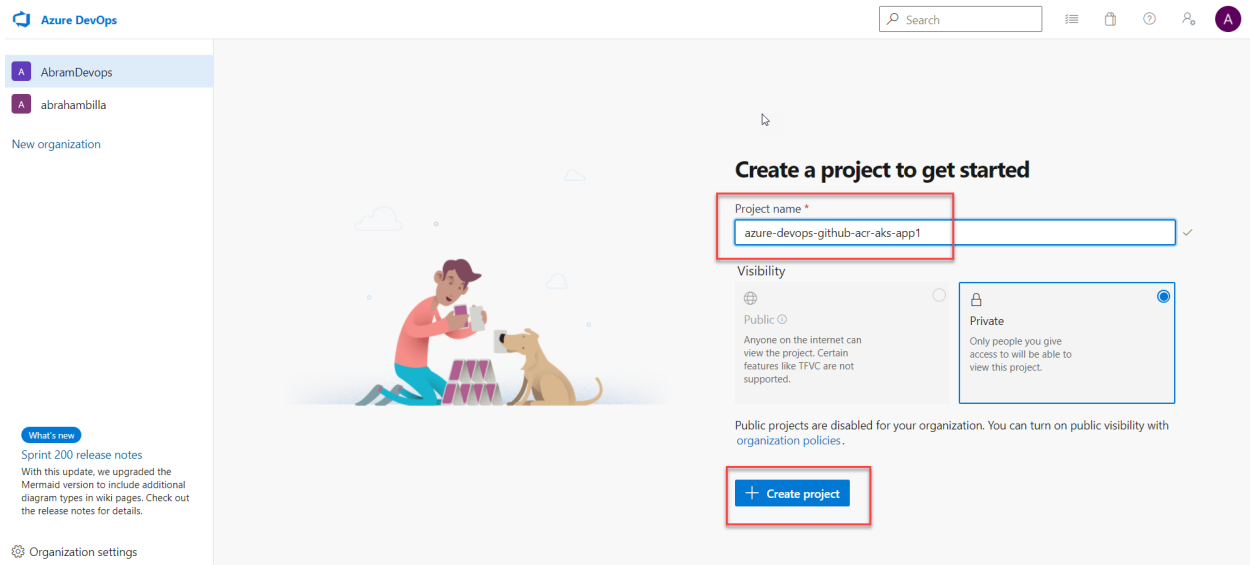


X464YXLGa

Continue

## Step-06 : Create DevOps Project

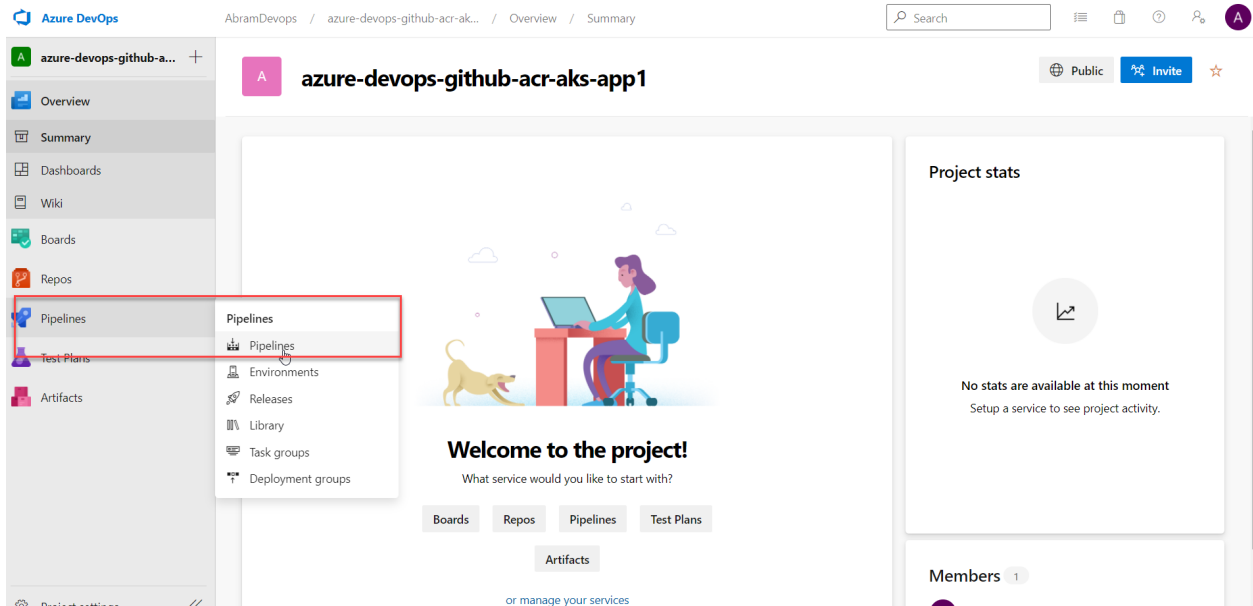
- Project Name: azure-devops-github-acr-aks-app1
- Project Description: AKS CI/CD Pipelines with Github and Azure Container Registry ACR
- Visibility: Private
- Advanced: Leave to defaults
  - Version Control: Git
  - Work Item Process: Basic



## Step-07: Create Basic Build Pipeline

Configure the repository for the artifacts

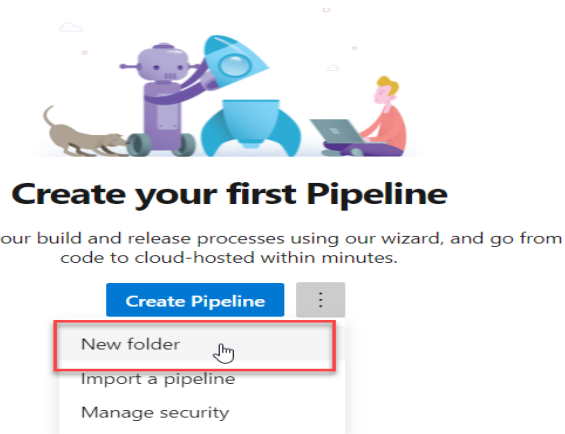




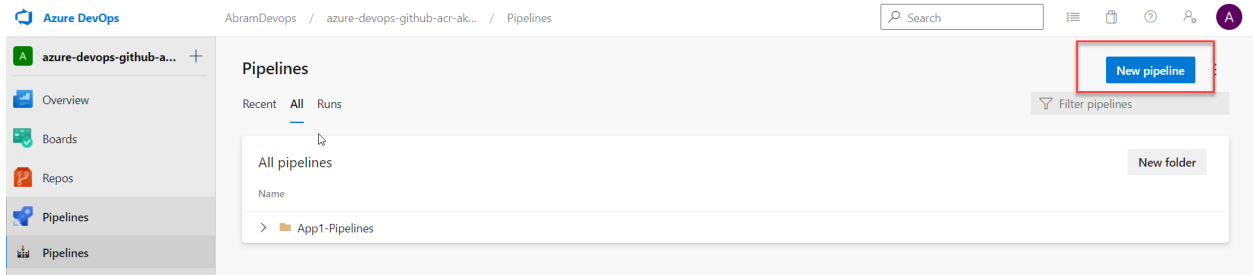
Verify the files

Create the Pipeline

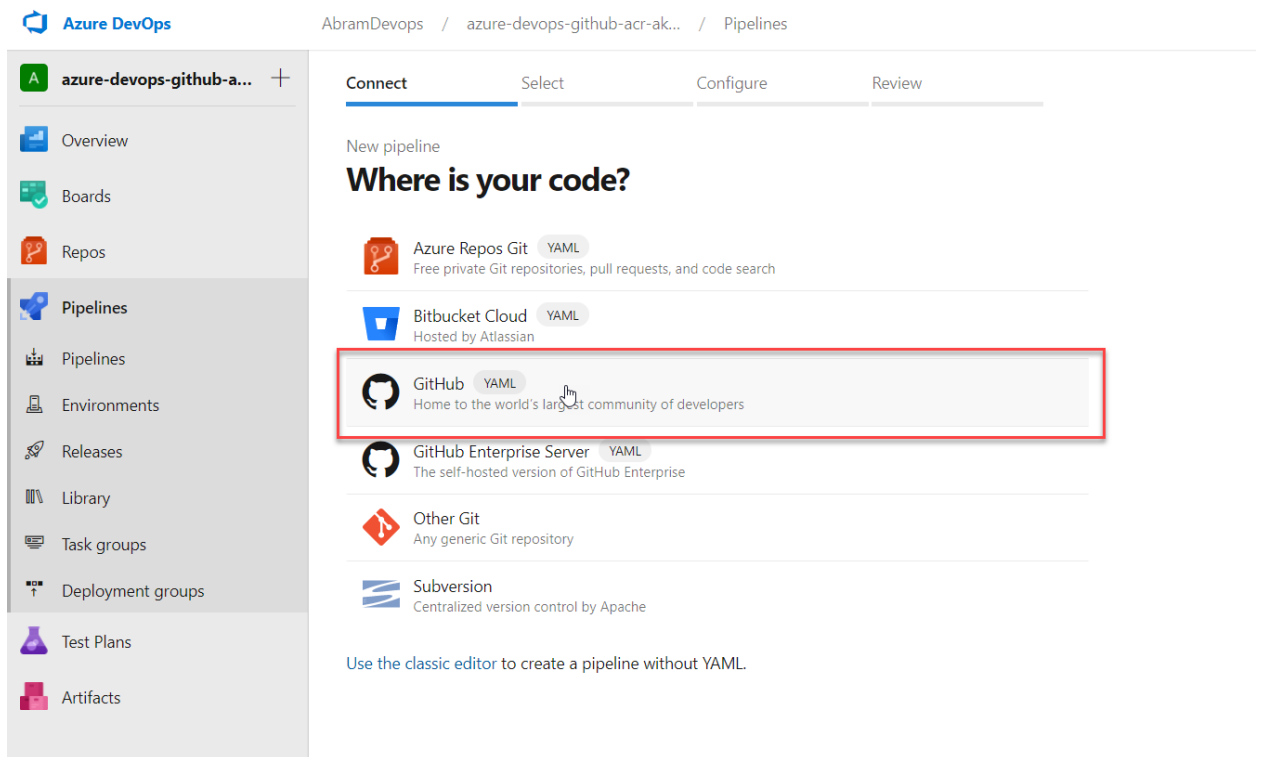
- Create Folder -> App1-Pipelines

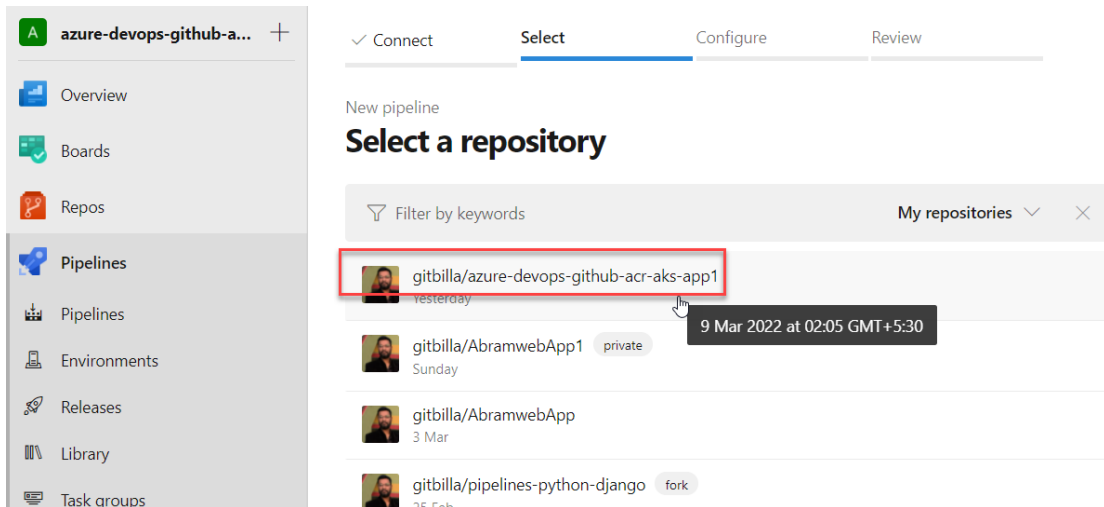


- Go to Pipelines -> Create New Pipeline



- Where is your Code?: Github

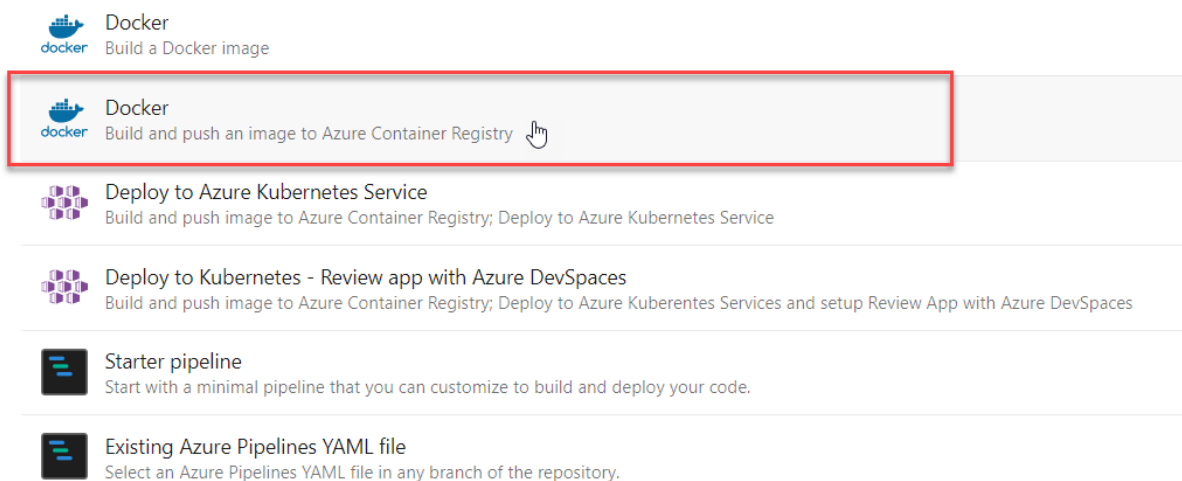




- Select Repository: azure-devops-github-acr-aks-app1
  - Provide github username and Password
  - Click on Approve and Install for Repositories selected
- Configure Your Pipeline: Docker (Build and Push Image to Azure Container Registry )

New pipeline

## Configure your pipeline



AbramDevOps / azure-devops-github-acr-ak... / Pipelines

✓ Connect


✓ Select


Configure


Review


New pipeline


Configure your pipeline


 Docker  
Build a Docker image

 Docker  
Build and push an image to Azure Container Registry

 Deploy to Azure Kubernetes Service  
Build and push image to Azure Container Registry; Deploy to Azure Kubernetes Service

 Deploy to Kubernetes - Review app with Azure DevSpaces  
Build and push image to Azure Container Registry; Deploy to Azure Kubernetes Services and setup Review App with Azure DevSpaces

 Starter pipeline  
Start with a minimal pipeline that you can customize to build and deploy your code.

 Existing Azure Pipelines YAML file  
Select an Azure Pipelines YAML file in any branch of the repository.

Show more

Docker

Build and push an image to Azure Container Registry

Select an Azure subscription

☒

Abraham Azure Account

Continue

## Docker



Build and push an image to Azure Container Registry

Container registry

Billaaksdevopsacr



Image Name

app1-nginx

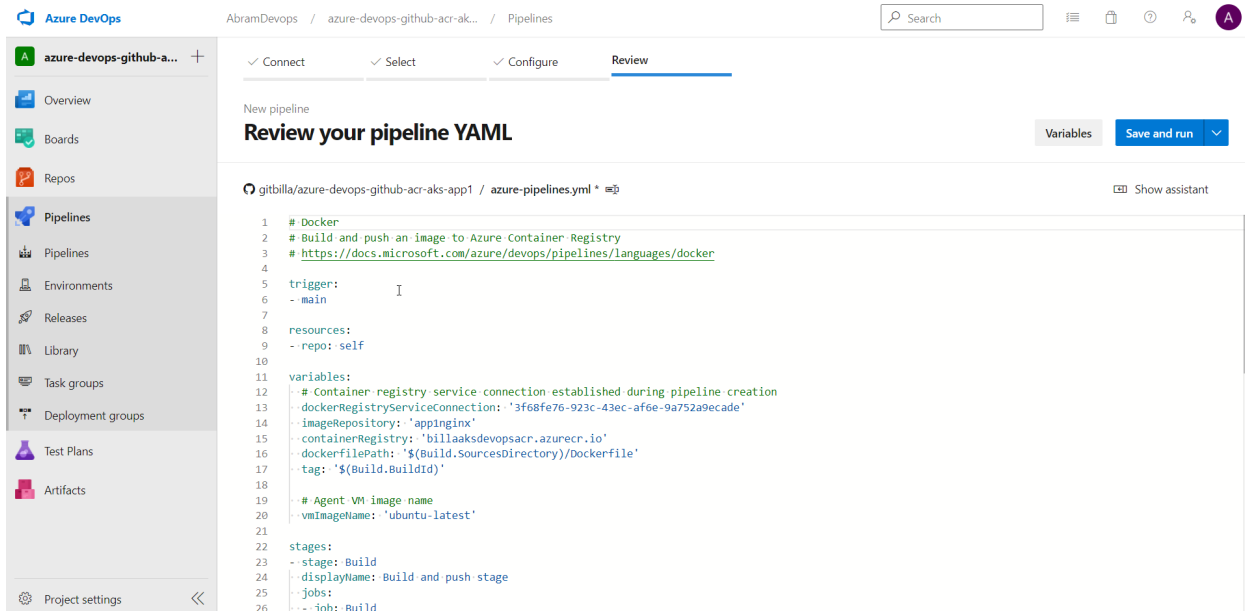
Dockerfile

\$(Build.SourcesDirectory)/Dockerfile

Back

Validate and configure

- Select an Azure Subscription: Abraham Azure Account
- Continue (Login as admin user)
- Container Registry: [Billaaksdevopsacr](#)
- Image Name: app1-nginx
- Dockerfile: \$(Build.SourcesDirectory)/Dockerfile
- Click on Validate and Configure

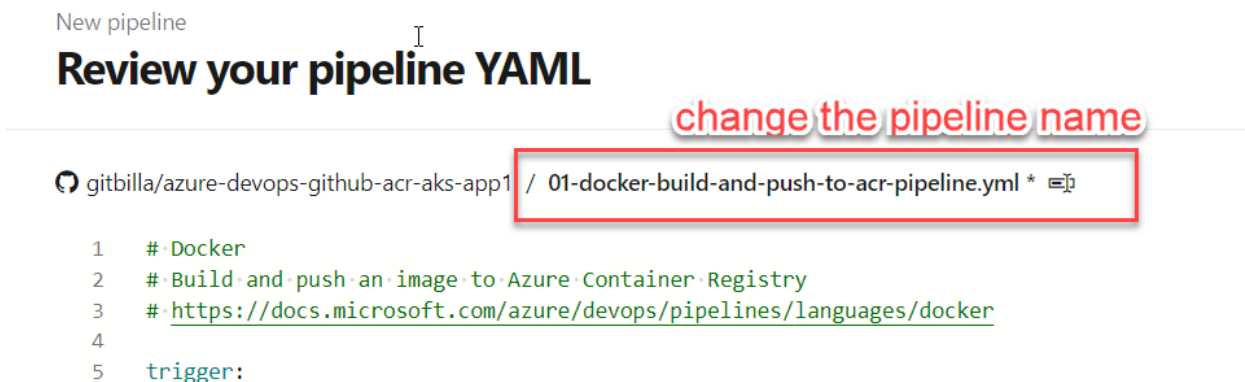


Azure DevOps interface showing the 'Review your pipeline YAML' step. The pipeline name is 'gitbilla/azure-devops-github-acr-aks-app1 / azure-pipelines.yml'. The YAML content is visible in the editor.

```

1 # Docker
2 # Build and push an image to Azure Container Registry
3 # https://docs.microsoft.com/azure/devops/pipelines/languages/docker
4
5 trigger:
6   - main
7
8 resources:
9   - repo: self
10
11 variables:
12   # Container registry service connection established during pipeline creation
13   dockerRegistryServiceConnection: '3f68fe76-923c-43ec-af6e-9a752a9ecade'
14   imageRepository: 'app1nginx'
15   containerRegistry: 'billaaksdevopsacr.azurecr.io'
16   dockerfilePath: '$(Build.SourcesDirectory)/Dockerfile'
17   tag: '$(Build.BuildId)'
18
19 # Agent VM image name
20 vmImageName: 'ubuntu-latest'
21
22 stages:
23   - stage: Build
24     displayName: Build and push stage
25     jobs:
26       - job: Build
  
```

- Change Pipeline Name: 01-docker-build-and-push-to-acr-pipeline.yml
- Click on Save and Run



Azure DevOps interface showing the 'Review your pipeline YAML' step. The pipeline name is 'gitbilla/azure-devops-github-acr-aks-app1 / 01-docker-build-and-push-to-acr-pipeline.yml'. A red box highlights the pipeline name, and a red arrow points to it with the text 'change the pipeline name'.

```

1 # Docker
2 # Build and push an image to Azure Container Registry
3 # https://docs.microsoft.com/azure/devops/pipelines/languages/docker
4
5 trigger:
  
```

- Commit Message: Pipeline-1: Docker Build and Push to ACR

Save and run

Saving will commit 01-docker-build-and-push-to-acr-pipeline.yml to the repository.

Commit message

Pipeline-1: Docker Build and Push to ACR

Optional extended description

Add an optional description...

☒ Commit directly to the main branch

☐ Create a new branch for this commit

Save and run

- Commit directly to master branch: check
- Click on Save and Run

#20220309.1 Pipeline-1: Docker Build and Push to ACR

gitbilla.azure-devops-github-acr-aks-app1

Cancel

Summary

Triggered by gitbilla

View change

Repository and version

Time started and elapsed

Related

Tests and coverage

gitbilla/azure-devops-github-acr-aks-app1

Just now

0 work items

Get started

main fd20902a

-

0 artifacts

Jobs

Name	Status	Duration
Build	Queued	

## Step-08: Review Build Logs & Docker Image in ACR

- Review Build logs
- Review Image in ACR

abrahambilla / AbramWebApps / Pipelines / gitbilla.azure-devops-github... / 20220309.1

Search

### Jobs in run #20220309.1

gitbilla.azure-devops-github-acr-aks-app1

Build and push stage

Job	Duration
Build	31s
Initialize job	<1s
Checkout gitbilla/azure...	3s
Build and push an ima...	26s
Post-job: Checkout git...	<1s
Finalize Job	<1s

### Build

```
1 Pool: Azure Pipelines
2 Image: ubuntu-latest
3 Agent: Hosted Agent
4 Started: Just now
5 Duration: 31s
6
7 Job preparation parameters
8 Job live console data:
9 Finishing: Build
```

Verify from azure portal

Microsoft Azure

Home > Container registries > Billaaksdevopsacr

### Container registries

Filter for any field...

Name ↑

Billaaksdevopsacr

### Billaaksdevopsacr | Repositories

Search (Ctrl+/)

Refresh

Search to filter repositories ...

Repositories ↑↓

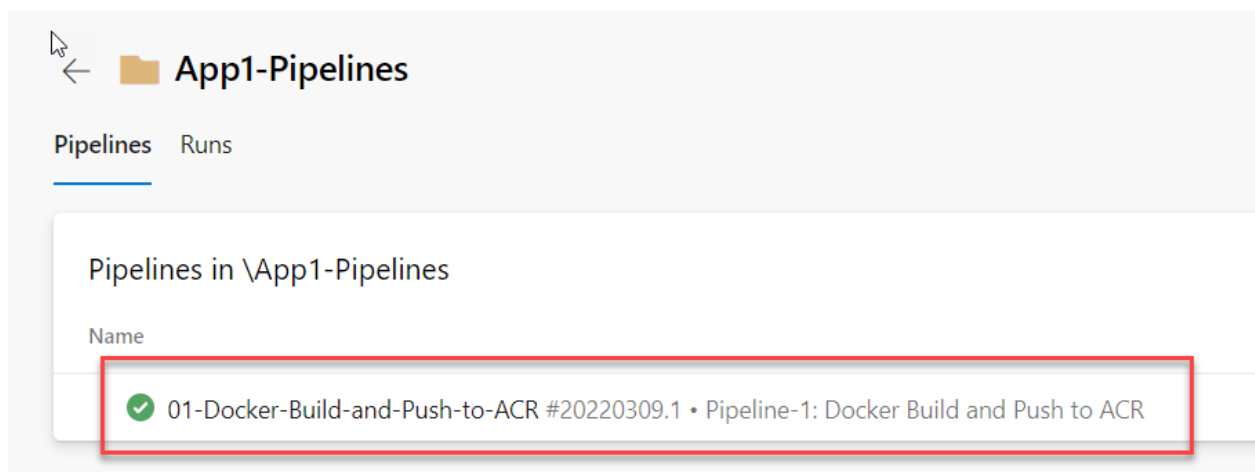
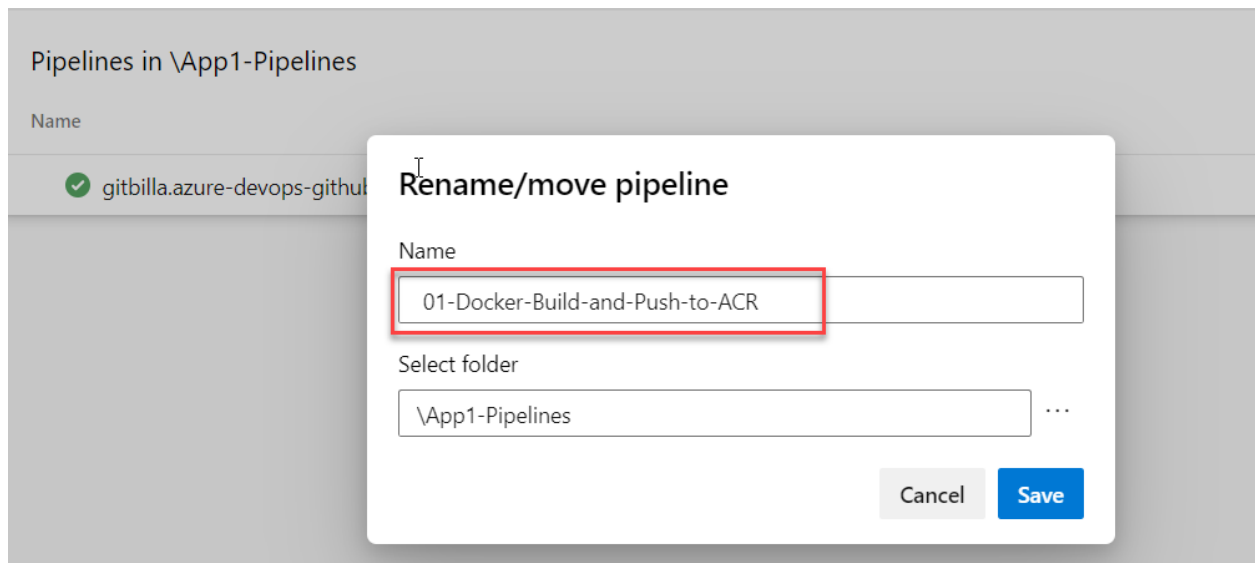
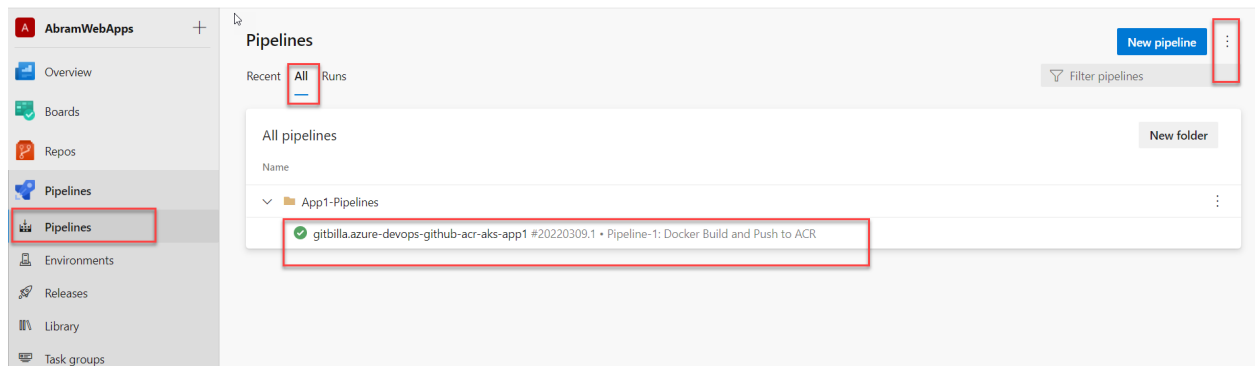
app1nginx

Page 1 of 1

## Step-09: Rename Pipeline Name



- Click on Pipeline -> Rename/Move
- Name: 01-Docker-Build-and-Push-to-ACR



## Step-10: Make changes to index.html and push changes to git repo - V2 Commit

```
# Pull changes related to pipeline to local repo
git pull
ls -lrt
```

```
Billa@DESKTOP-2SFP2EH MINGW64 ~/Desktop/VisualCode-Apps/azure-devops-github-acr-aks-app1 (main)
$ git pull
remote: Enumerating objects: 8, done.
remote: Counting objects: 100% (8/8), done.
remote: Compressing objects: 100% (7/7), done.
remote: Total 7 (delta 4), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (7/7), 1.61 KiB | 4.00 KiB/s, done.
From https://github.com/gitbilla/azure-devops-github-acr-aks-app1
 fafeec4..82f835f  main      -> origin/main
Updating fafeec4..82f835f
Fast-forward
 01-docker-build-and-push-to-acr-pipeline.yml | 39 +++++
 1 file changed, 39 insertions(+)
 create mode 100644 01-docker-build-and-push-to-acr-pipeline.yml

Billa@DESKTOP-2SFP2EH MINGW64 ~/Desktop/VisualCode-Apps/azure-devops-github-acr-aks-app1 (main)
$ ls -la
total 19
drwxr-xr-x 1 Billa 197121  0 Mar 10 00:54 ./
drwxr-xr-x 1 Billa 197121  0 Mar  9 19:09 ../
drwxr-xr-x 1 Billa 197121  0 Mar 10 00:54 .git/
-rw-r--r-- 1 Billa 197121 1059 Mar 10 00:54 01-docker-build-and-push-to-acr-pipeline.yml
-rw-r--r-- 1 Billa 197121  49 Mar  9 19:09 Dockerfile
-rw-r--r-- 1 Billa 197121 248 Mar  9 19:09 index.html
drwxr-xr-x 1 Billa 197121  0 Mar  9 19:09 kube-manifests/
-rw-r--r-- 1 Billa 197121 108 Mar  9 19:09 README.md

Billa@DESKTOP-2SFP2EH MINGW64 ~/Desktop/VisualCode-Apps/azure-devops-github-acr-aks-app1 (main)
$
```

```
# Make changes to index.html
index.html file - change version v1
```

```
$ cat index.html
<!DOCTYPE html>
<html>
  <body style="background-color:rgb(212, 240, 234);">
    <h1>Abraham Welcome to - Azure DevOps App1 - V1</h1>
    <h2>Azure DevOps Demo App1</h2>
    <h2>Application Version: V1</h2>
  </body>
</html>
```

```
# Push changes
git add .
git commit -am "V2 Commit for index.html"
git push
```

```

Billa@DESKTOP-2SFP2EH MINGW64 ~/Desktop/VisualCode-Apps/azure-devops-github-acr-aks-app1 (main)
$ git add .

Billa@DESKTOP-2SFP2EH MINGW64 ~/Desktop/VisualCode-Apps/azure-devops-github-acr-aks-app1 (main)
$ git commit -m "v2 commit"
[main 79726bc] v2 commit
1 file changed, 1 insertion(+), 1 deletion(-)

Billa@DESKTOP-2SFP2EH MINGW64 ~/Desktop/VisualCode-Apps/azure-devops-github-acr-aks-app1 (main)
$ pwd
/c/Users/Billa/Desktop/VisualCode-Apps/azure-devops-github-acr-aks-app1

Billa@DESKTOP-2SFP2EH MINGW64 ~/Desktop/VisualCode-Apps/azure-devops-github-acr-aks-app1 (main)
$ git push
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 307 bytes | 307.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0)
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/gitbilla/azure-devops-github-acr-aks-app1.git
82f835f..79726bc main -> main

```

gitbilla / azure-devops-github-acr-aks-app1 Public

<> Code Issues Pull requests Actions Projects Wiki Security Insights Settings

main 2 branches 0 tags Go to file Add file Code

Commit	Message	Time
gitbilla v2 commit	79726bc 3 minutes ago 10 commits	
kube-manifests	kubectl dir added	23 hours ago
01-docker-build-and-push-to-acr-pi...	Pipeline-1: Docker Build and Push to ACR	20 minutes ago
Dockerfile	docker and index added	23 hours ago
README.md	Initial commit	yesterday
index.html	v2 commit	3 minutes ago

README.md edit

The pipeline will automatically trigger

<a href="#">←</a> 01-Docker-Build-and-Push-to-ACR <span>Edit</span> <span>Run pipeline</span> <span>⋮</span>		
<a href="#">Runs</a> <a href="#">Branches</a> <a href="#">Analytics</a> <span>⌵</span>		
Description	Stages	
<div>#20220309.2 v2 commit</div> <div>Individual CI for  main 79726bcf</div>		<div>Just now</div> <div>23s</div>
<div>#20220309.1 Pipeline-1: Docker Build and Push to ACR</div> <div>Individual CI for  main 82f835f0</div>		<div>18m ago</div> <div>36s</div>

**app1nginx** ...  
 Repository

Refresh
 Delete repository

### ^ Essentials

Repository : app1nginx

Last updated date : 3/10/2022, 1:01 AM GMT+5:30

Search to filter tags ...

Tags ↑↓

7

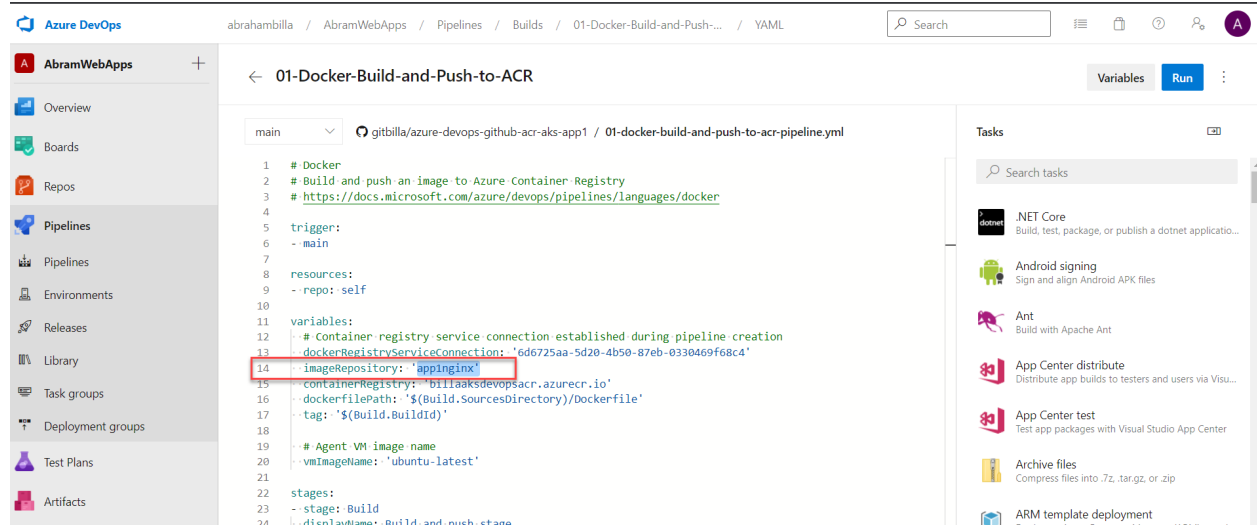
6

- Verify Build logs
- Verify ACR Image

## Step-12: Add Namespace for Docker Images stored in ACR

- Go to Pipeline -> 01-Docker-Build-and-Push-to-ACR -> Edit
- Update the below and Save

# Before  
imageRepository: 'app1nginx'



The screenshot shows the Azure DevOps interface for a pipeline named '01-Docker-Build-and-Push-to-ACR'. The pipeline is configured to build and push an image to Azure Container Registry. The configuration includes a trigger for 'main', resources for 'self', and variables for 'dockerRegistryServiceConnection' and 'imageRepository'. The 'imageRepository' variable is highlighted with a red box and contains the value 'app1nginx'.

# After  
imageRepository: 'app1/app1nginx'

```
11 variables:
12 | · # Container registry service connection established during pipeline creation
13 | · dockerRegistryServiceConnection: '6d6725aa-5d20-4b50-87eb-0330469f68c4'
14 | · imageRepository: 'app1/app1nginx'
15 | · containerRegistry: 'billaaksdevopsacr.azurecr.io'
16 | · dockerfilePath: '$(Build.SourcesDirectory)/Dockerfile'
17 | · tag: '$(Build.BuildId)'
18 |
```

**Save**

Saving will commit 01-docker-build-and-push-to-acr-pipeline.yml to the repository.

Commit message

namespace added to ACR

Optional extended description

Add an optional description...

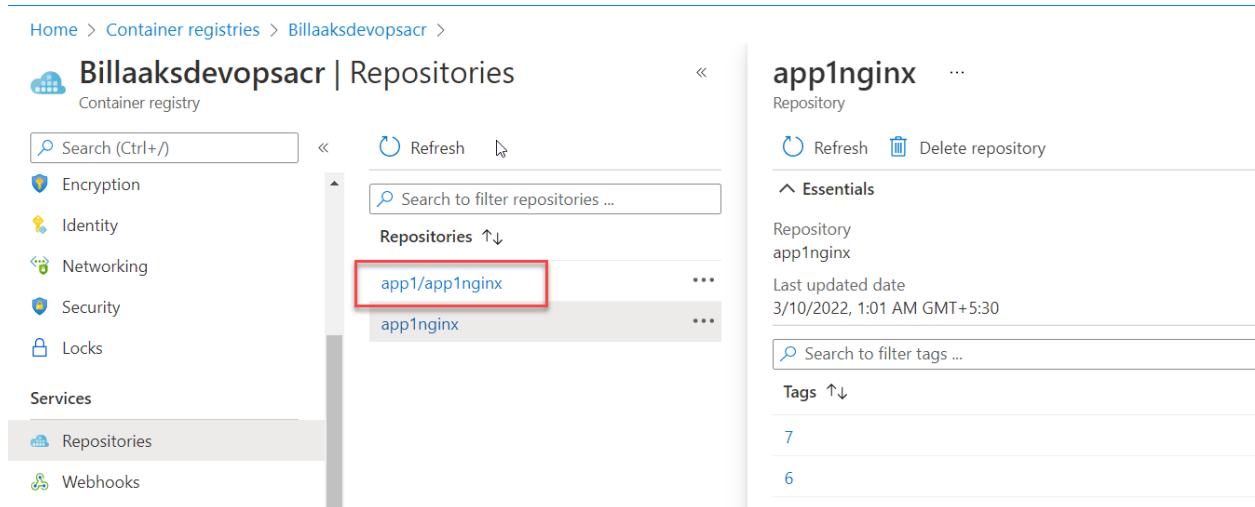
☒ Commit directly to the main branch

☐ Create a new branch for this commit

Once the name is changed the pipeline gets triggered

01-Docker-Build-and-Push-to-ACR			Edit	Run pipeline	
Runs Branches Analytics					
Description	Stages				
#20220309.3 namespace added to ACR Individual CI for main 8b011301			Just now 12s		
#20220309.2 v2 commit Individual CI for main 79726bcf			12m ago 33s		
#20220309.1 Pipeline-1: Docker Build and Push to ACR Individual CI for main 82f835f0			29m ago 36s		

- Verify Build logs
- Verify ACR Image



## Step-13: Make changes to index.html and push changes to git repo - V3 Commit

```
# Pull changes related to pipeline to local repo
git pull
ls -lrt

# Make changes to index.html
index.html file - change version v3

# Push changes
git add .
git commit -am "V3 Commit for index.html"
git push
```

- Verify Build logs
- Verify ACR Image

## Step-14: Disable Pipeline

- Go to Pipeline -> 01-Docker-Build-and-Push-to-ACR -> Settings -> Disable

← 01-Docker-Build-and-Push-to-ACR

Runs Branches Analytics

Description	Stages
#20220309.3 namespace added to ACR Individual CI for main 8b011301	✓
#20220309.2 v2 commit Individual CI for main 79726bcf	✓
#20220309.1 Pipeline-1: Docker Build and Push to ACR Individual CI for main 82f835f0	✓

Edit Run pipeline ⋮

- Manage security
- Rename/move
- Status badge
- Trigger issues
- Settings
- Delete
- Scheduled runs

36s

## Pipeline settings



### Processing of new run requests

- ☐ Enabled  
☐ Paused  
☒ Disabled

### YAML file path

01-docker-build-and-push-to-acr-pipeline.yml

## Step-15: Review Pipeline code

- Click on Pipeline -> Edit Pipeline
- Review pipeline code
- Review Service Connections

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

trigger:
- master
```



```
resources:
- repo: self

variables:
  # Container registry service connection established during pipeline creation
  dockerRegistryServiceConnection: '6a8843fd-7313-48e2-9381-3f9ef59ce82d' ##
Review Service Connections
  imageRepository: 'appl/applnginx'
  containerRegistry: 'aksdevopsacr.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)
```

## AZURE Storage

### 1. Create a AKS

```
# az group create --name abram-rg --location southindia
```

```
# abraham@Azure:~$ az aks create --resource-group abram-rg --name abramAKS --location southindia --kubernetes-version 1.20.15 --node-count 1 --network-plugin azure --disable-rbac --generate-ssh-keys
```

```

abraham@Azure:~$ kubectl cluster-info
To further debug and diagnose cluster problems, use 'kubectl cluster-info dump'.
error: You must be logged in to the server (the server has asked for the client to provide credentials)
abraham@Azure:~$ az group create --name abram-rg --location southindia
{
  "id": "/subscriptions/71d0786c-dbfd-4e2f-9d48-49838b718991/resourceGroups/abram-rg",
  "location": "southindia",
  "managedBy": null,
  "name": "abram-rg",
  "properties": {
    "provisioningState": "Succeeded"
  },
  "tags": null,
  "type": "Microsoft.Resources/resourceGroups"
}
abraham@Azure:~$ az provider show -n Microsoft.OperationsManagement -o table
Namespace                RegistrationPolicy  RegistrationState
-----
Microsoft.OperationsManagement  RegistrationRequired  Registered
abraham@Azure:~$ az provider show -n Microsoft.OperationalInsights -o table
Namespace                RegistrationPolicy  RegistrationState
-----
Microsoft.OperationalInsights  RegistrationRequired  Registered
abraham@Azure:~$ az aks create --resource-group abram-rg --name abramAKS --location southindia --kubernetes-version 1.20.15 --node-count 1 --network-plugin azure --disable-rbac --generate-ssh-keys
SSH key files '/home/abraham/.ssh/id_rsa' and '/home/abraham/.ssh/id_rsa.pub' have been generated under ~/.ssh to allow SSH access to the VM. If using machines without permanent storage like Azure Cloud Shell without an attached file share, back up your keys to a safe location
Running

```

## 2. #az aks get-credentials --resource-group abram-rg --name abramAKS

```

abraham@Azure:~$ az aks get-credentials --resource-group abram-rg --name abramAKS
Merged "abramAKS" as current context in /home/abraham/.kube/config
abraham@Azure:~$

```