DevSecOps, day 2

2. Lab: Tasks completed

You've done some work

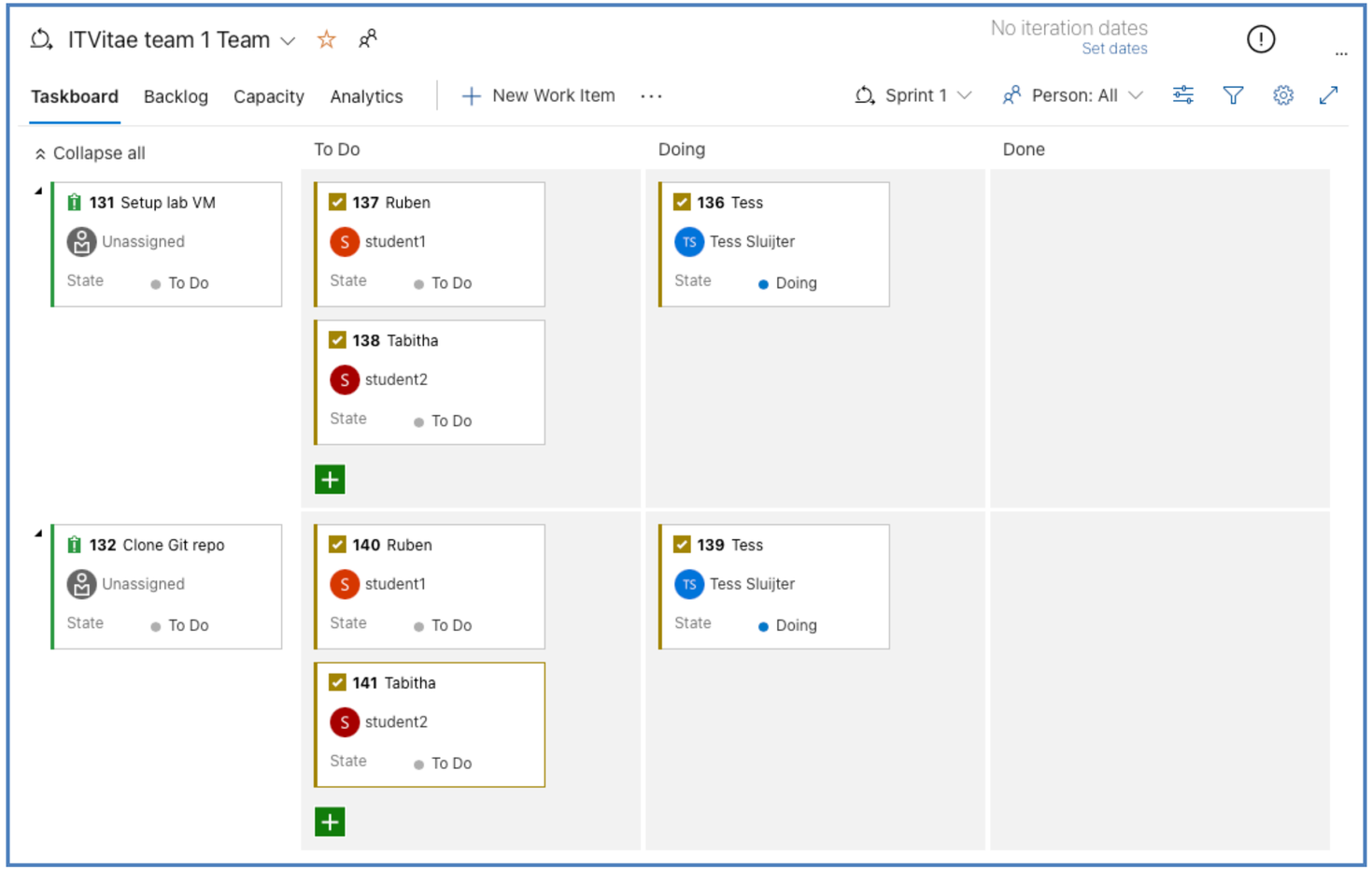
- Yesterday, you already completed a few stories!
  - You installed your Dev Workstations.
  - You cloned the Git repositories.
  - You got the local JuiceShop to run.

Assignment

- Make a task, per team member, for these stories:
  - Setup Lab VM
  - Clone Git repo
  - Run local test.
- Set the tasks AND the stories to "Done".

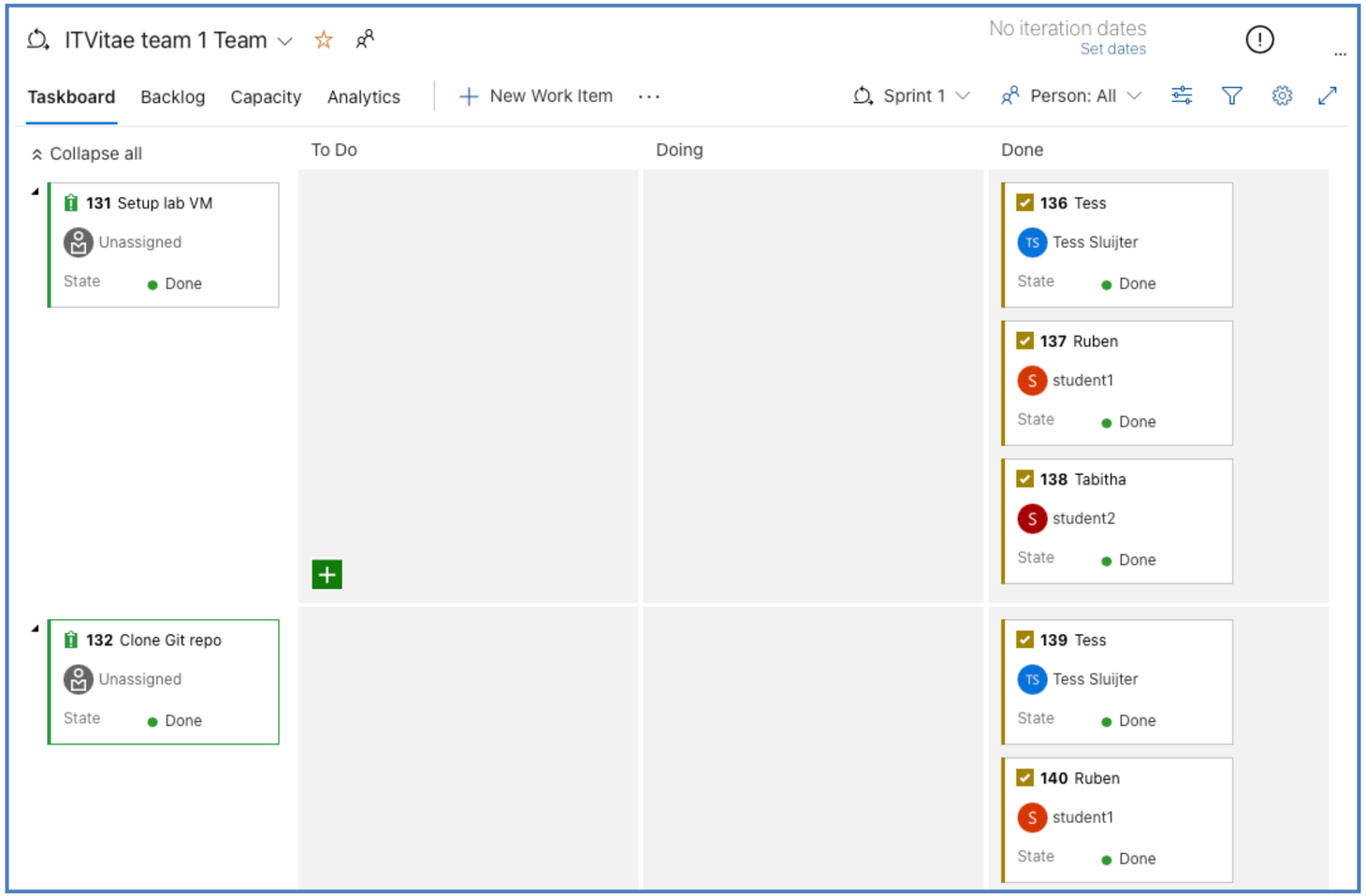
For example

- From:



For example

- To:



4. Lab: Branches

Making extra branches

- You can do this from your Dev Workstation.

```
$ cd ~/Team1JS
$ git checkout master
$ git branch dev; git push --all
```

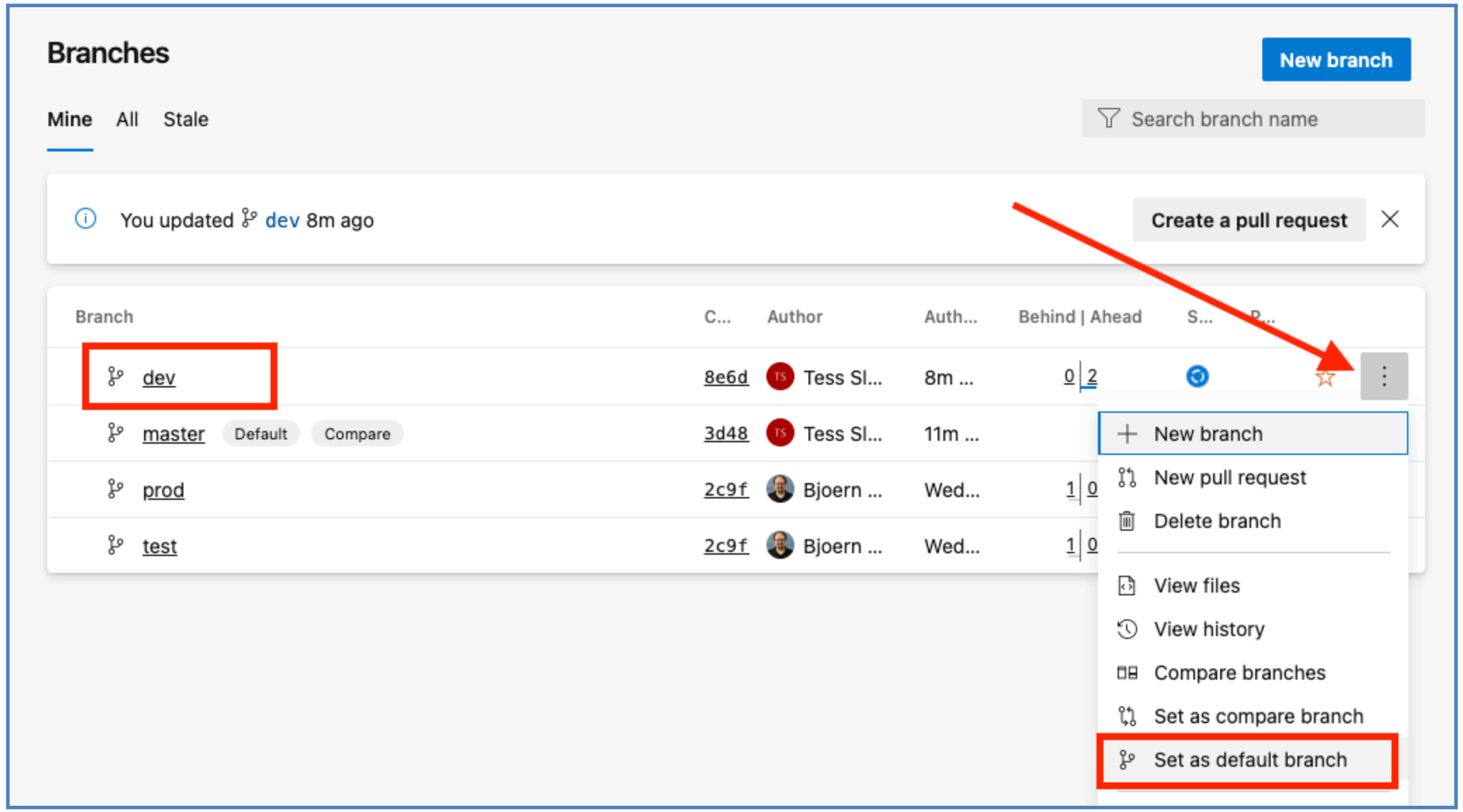
- Or in the Azure Repositories GUI.

Making extra branches

- Make three new branches, all FROM master:
  - dev
  - test
  - prod

- All four are now at the exact same state.

Set "dev" as default



A quick merging exercise

- One team member makes a new file,
  - On the "dev" branch. Call it "*team.txt*".
  - They put their name in the file and save it.

- Commit that new file to the "dev" branch.
- Then push to Azure Git.

A quick merging exercise

- The other team members can now "git pull".
  - Their "dev" branch should include "team.txt".
- The other team members now add their name.
  - Each in their local copy of the file.
- Commit to "dev" branch.

A quick merging exercise

- In a team with more than two,
  - Whomever first pushes, has it easy. ;)
  - The others will be told to first "*git pull*".

- And when they "*git pull*", they will be told to merge.
  - Follow the instructions.
  - Then "git push" again.

A quick merging exercise

- This will take some messing around!

- Normally you don't all dogpile onto the same file.
  - You usually work on the files for your feature.

Hooray for extensions!

- A pull req might lead to a merge conflict.
  - AzDO does not have a nice way to handle this.

- To make this easier, I have added an AzDO plugin:
  - PullReq merge conflict tab

Checkpoint!

- Does everyone have:
  - Three new branches? dev/test/prod

- Did you prove they all work?!

6. Lab: Local Docker container

Dockerfile

- The JuiceShop repository contains a config file.
  - "*Dockerfile*" is used to define an image build.
  - Each line is an instruction to Docker.

- Read the "*Dockerfile*".
  - See if you recognize what we did yesterday.

Assignment: build container

- Let's makes a container image with the full web app.
  - Like before, "*npm install*" takes a long time.
  - It will take 3 to 15 minutes.

```
$ docker build -t team1:dev .
```

Assignment: run container

- You can use the container to run your app!

```
$ docker run --rm -p 3000:3000 team1:dev
```

- Access it on http://localhost:3000

Assignment: run container

- Either use your host OS' browser.
  - Or test with *curl* on the DEV VM.

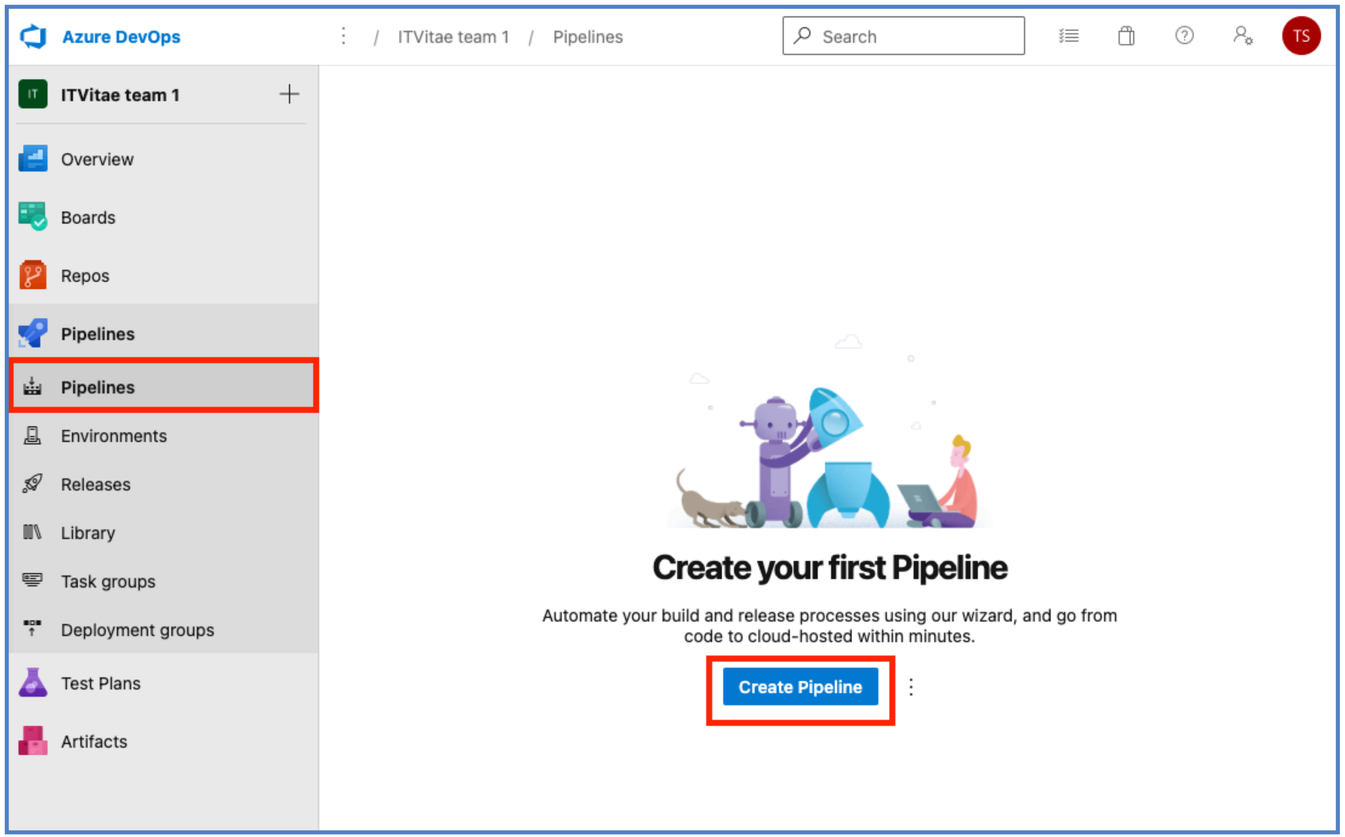
9. Lab: CI/CD pipelines

What we will make

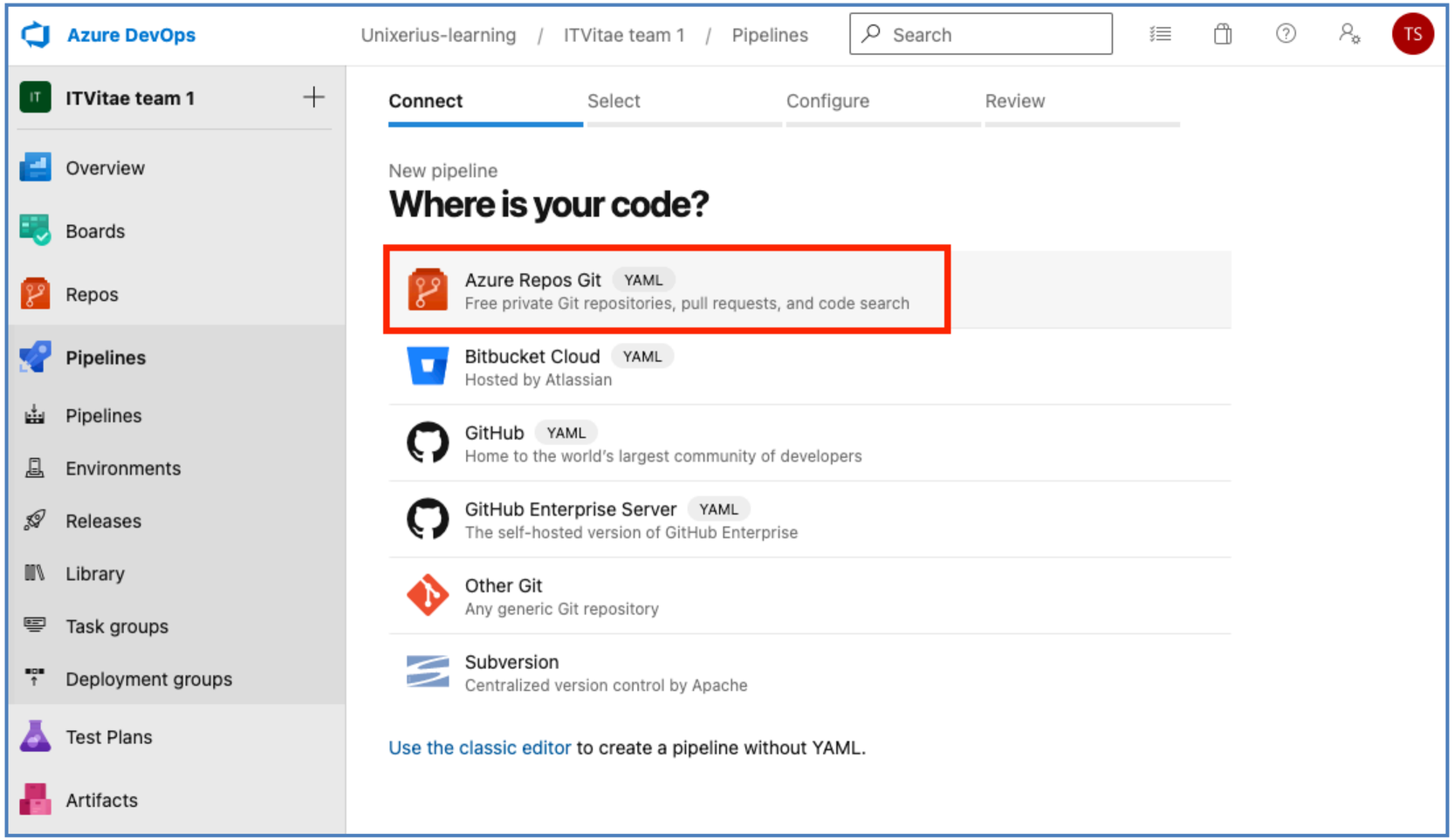
- A CICD pipeline which:
  - Logs in to Azure Container Registry.
  - Builds and pushes the JuiceShop image.
  - Logs out from ACR.
  - Orders Azure WebApp to deploy the image.

Start with a "dummy"

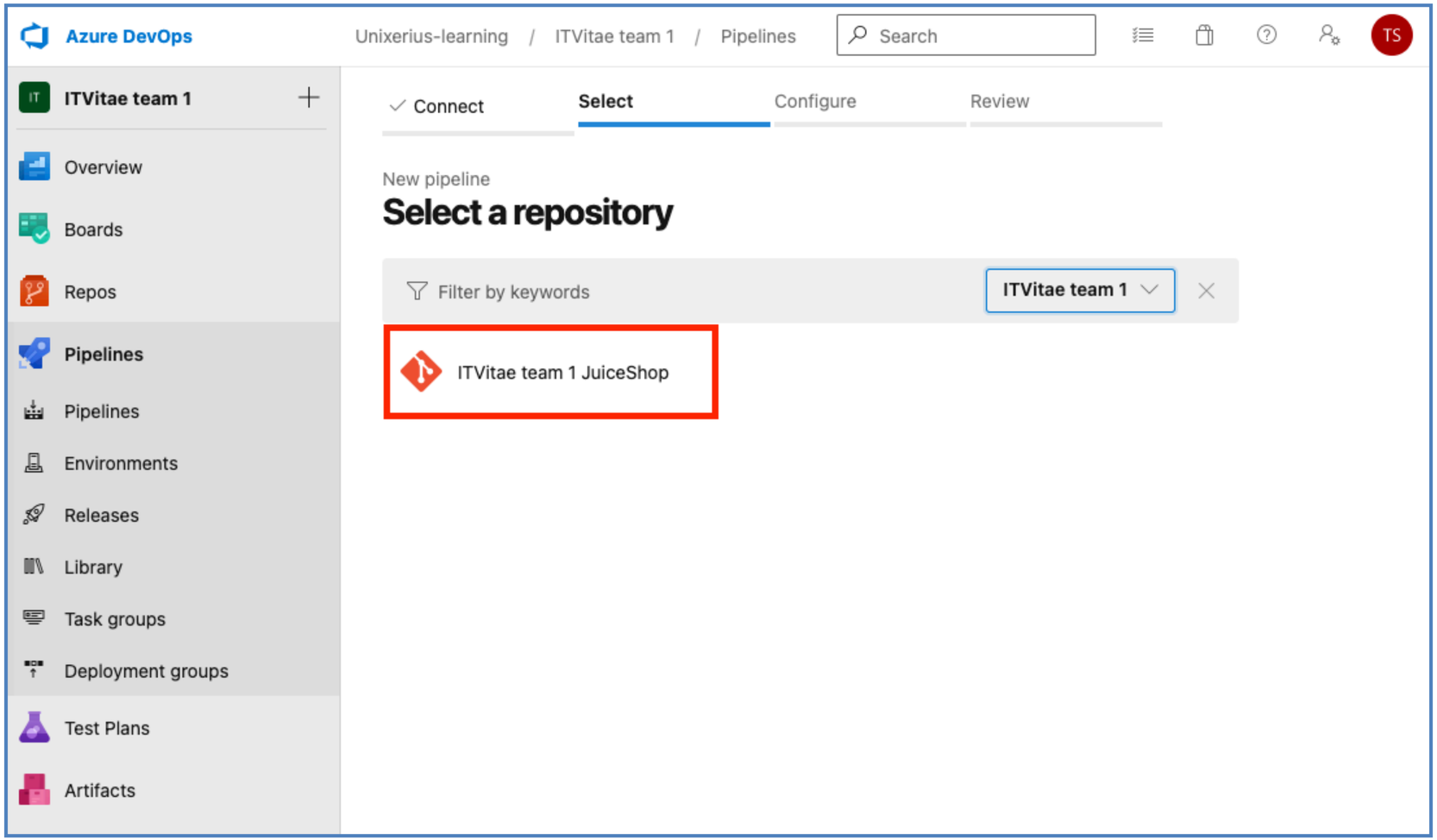
- Go to **Pipelines.**
- Create a new pipeline.



Start with a "dummy"

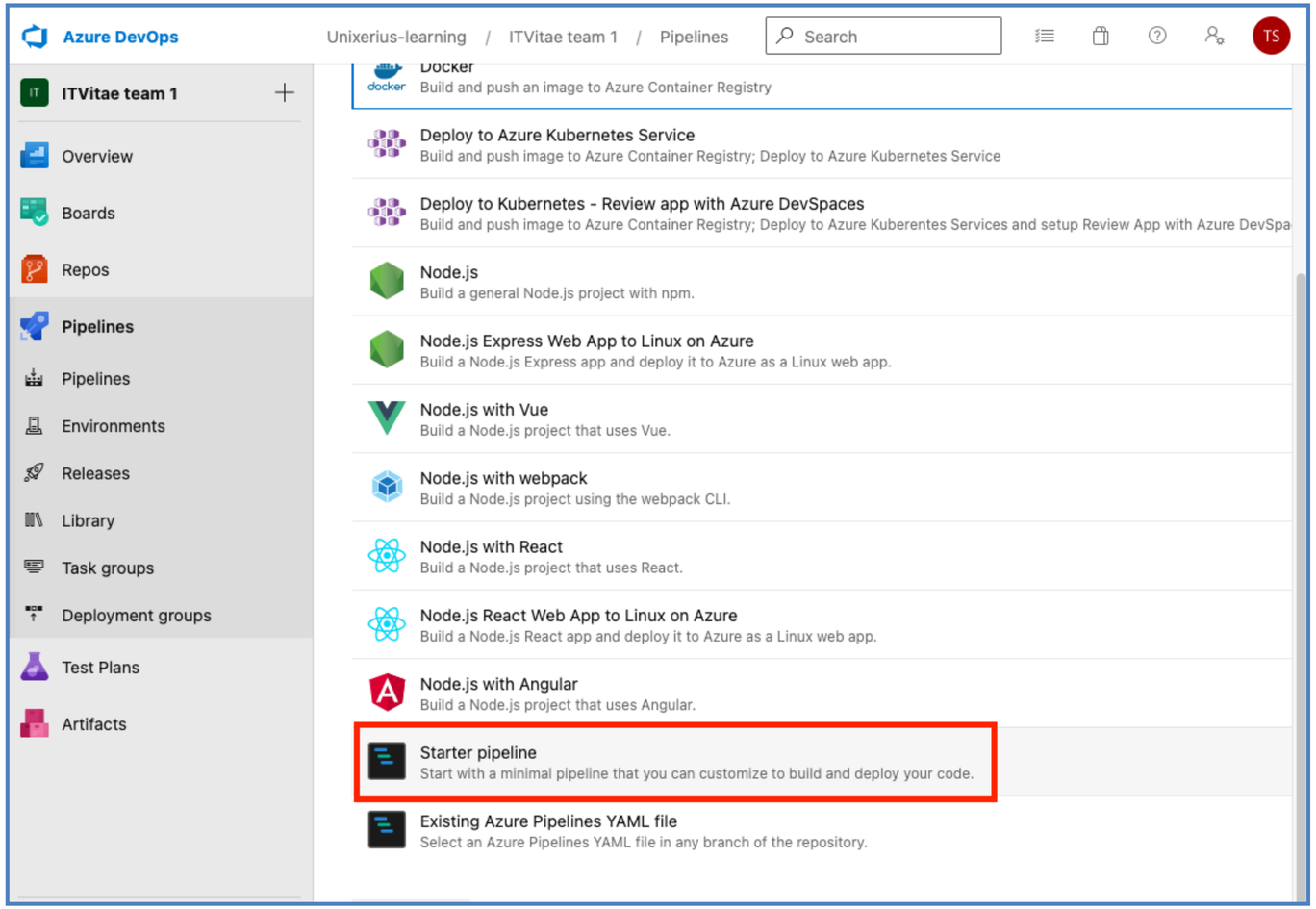


Start with a "dummy"



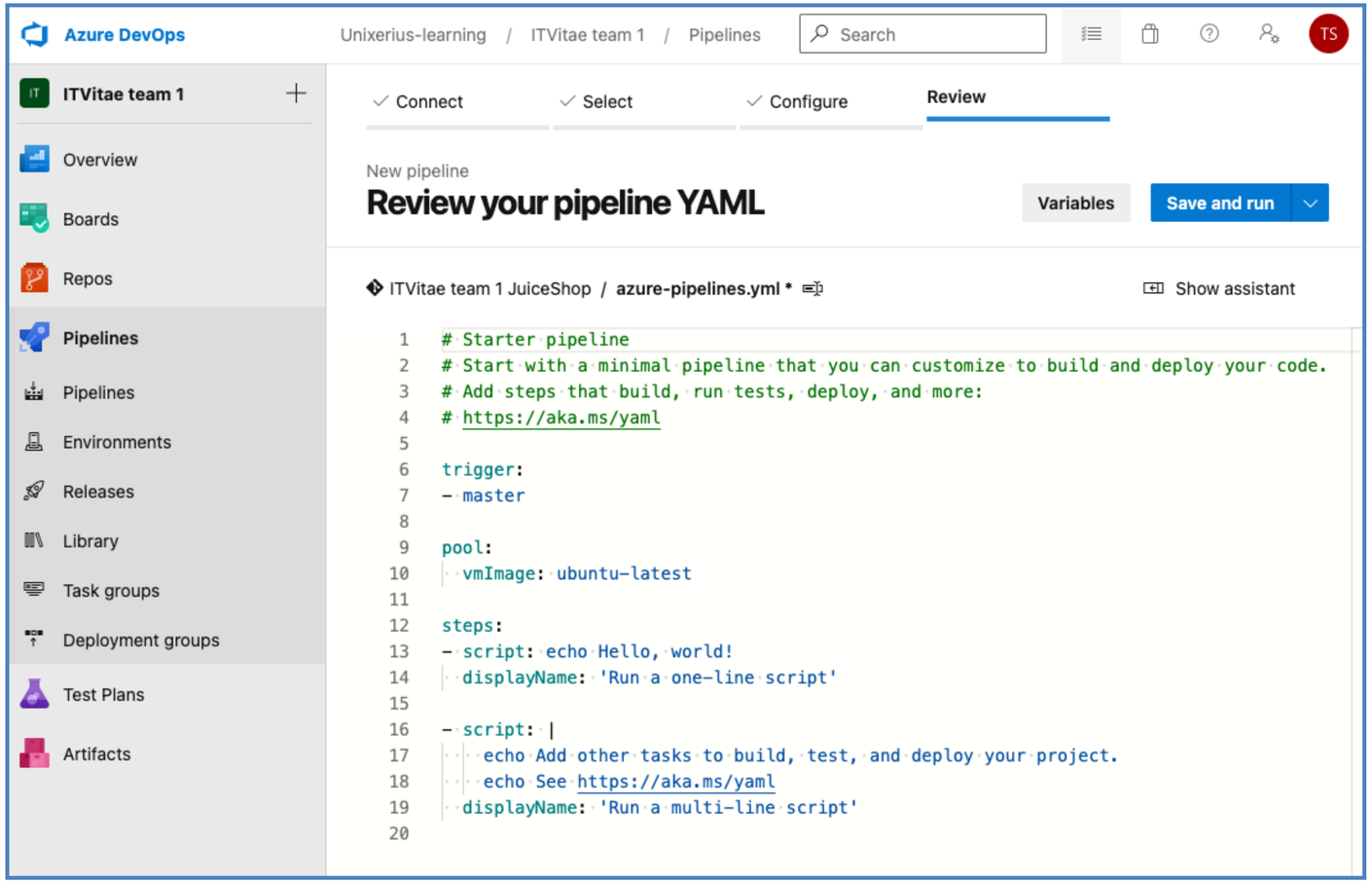
Start with a "dummy"

- Choose type:
  - "Starter pipeline".



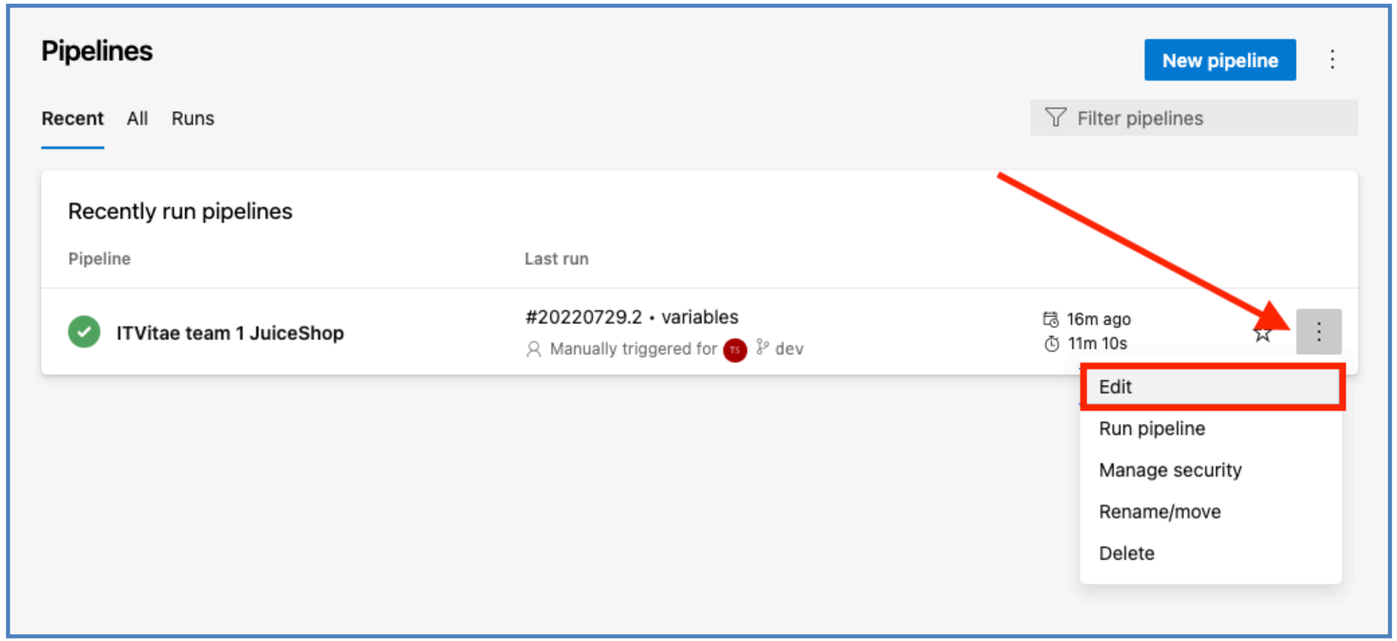
Start with a "dummy"

- A dummy is made.
- Click "Save and run".

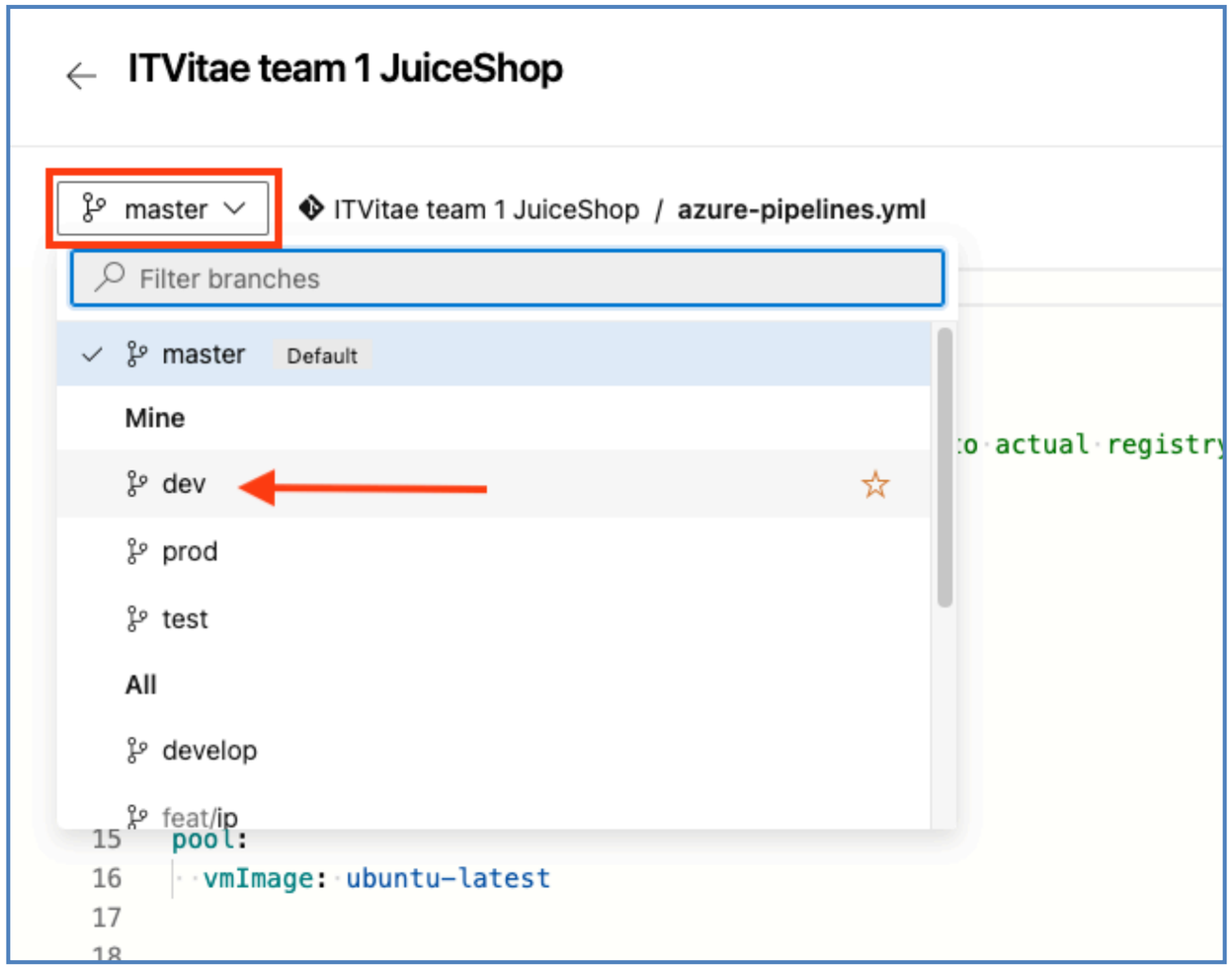


Building our pipeline

- Go back to the **Pipelines** tab.
- Edit the pipeline and choose the "dev" branch!



Building our pipeline



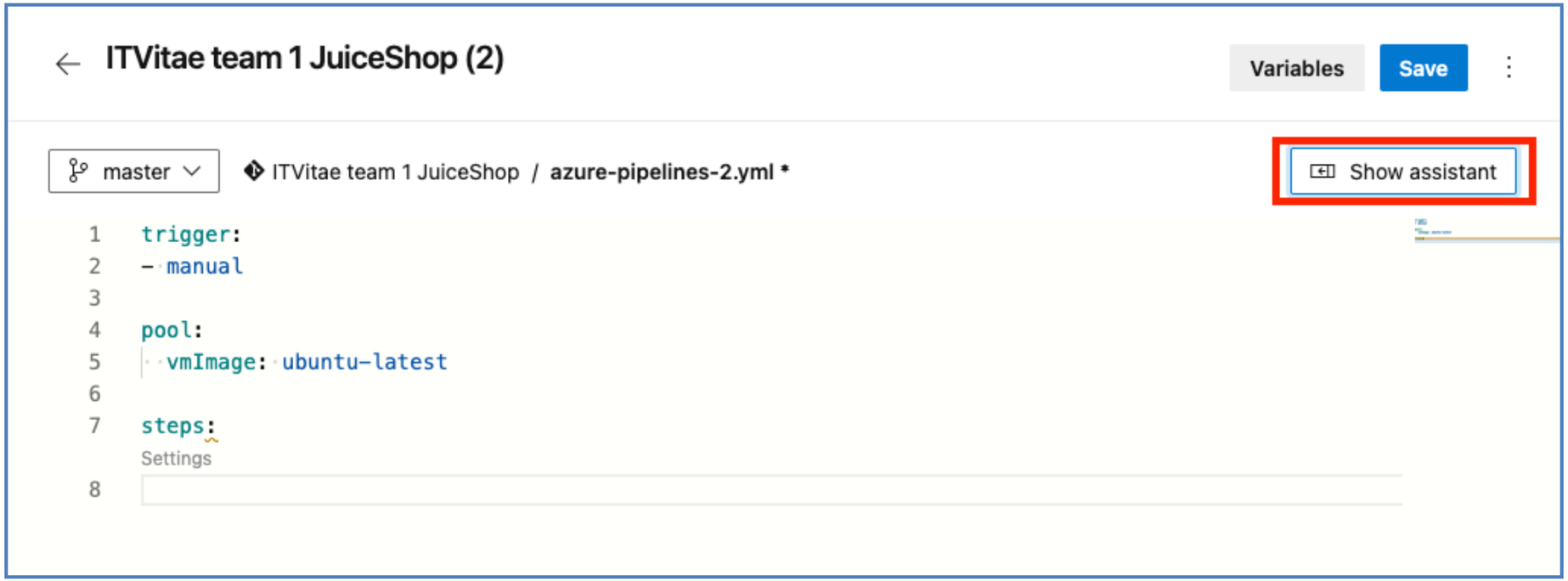
Cleanup ...

- Change the "trigger", to "*manual*".
- We can remove the dummy lines under "steps:"

```yaml
trigger:
- manual

pool:
  vmImage: ubuntu-latest

steps:

```

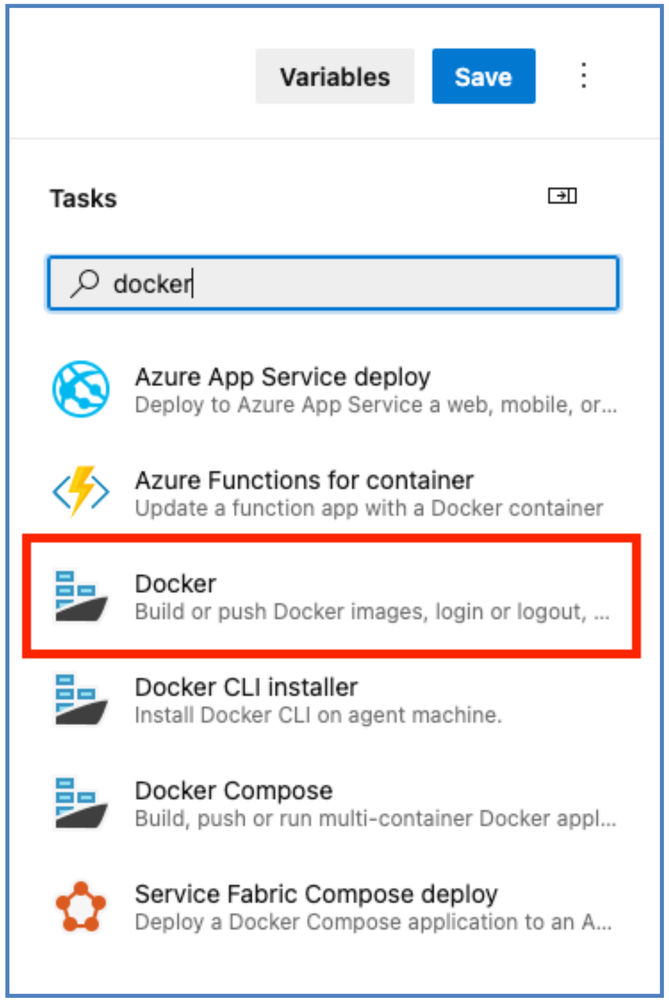
Docker login / logout

- Pull up the wizard, which has all plugins.



Docker login / logout

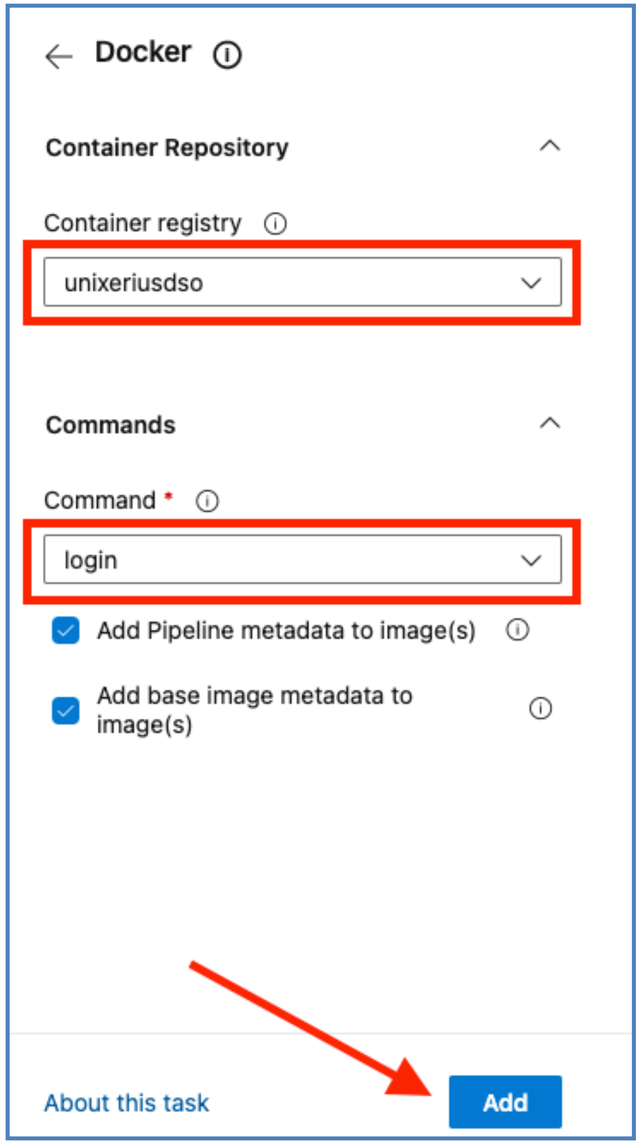
- Search for Docker,
  - Grab the one for login/logout



Docker login / logout

- Chose "*Login*" as command.
- Chose the "*unixeriusdso*" registry.

- Repeat for "*Logout*".



Docker login / logout

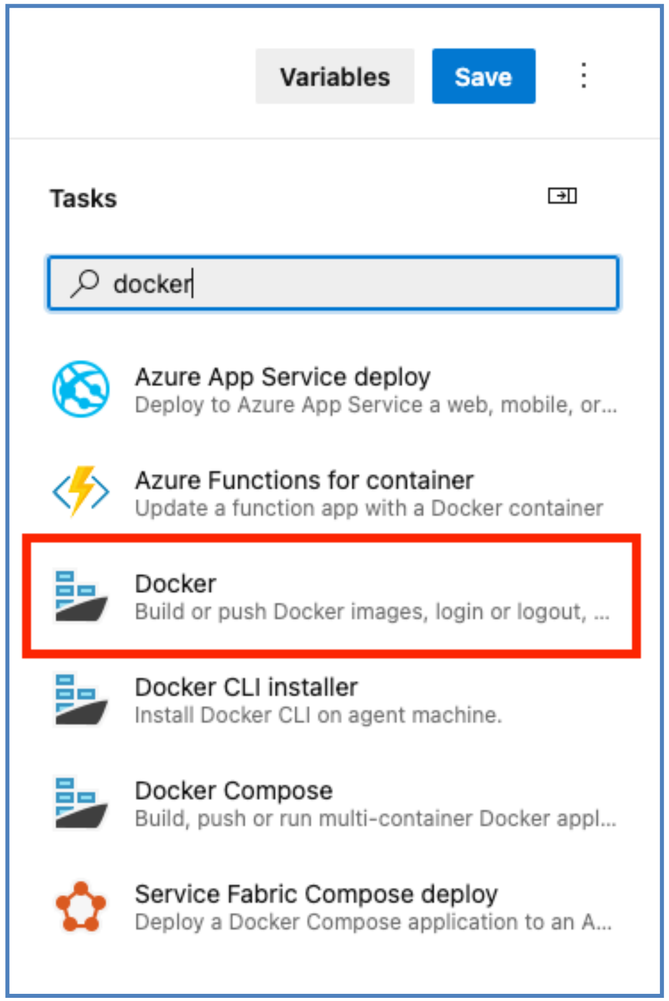
- Your code should be ->

- Save and run, to test.

```yaml
trigger:
- manual

pool:
  vmImage: ubuntu-latest

steps:
Settings
- task: Docker@2
  inputs:
    containerRegistry: 'unixeriusdso'
    command: 'login'
Settings
- task: Docker@2
  inputs:
    containerRegistry: 'unixeriusdso'
    command: 'logout'
```

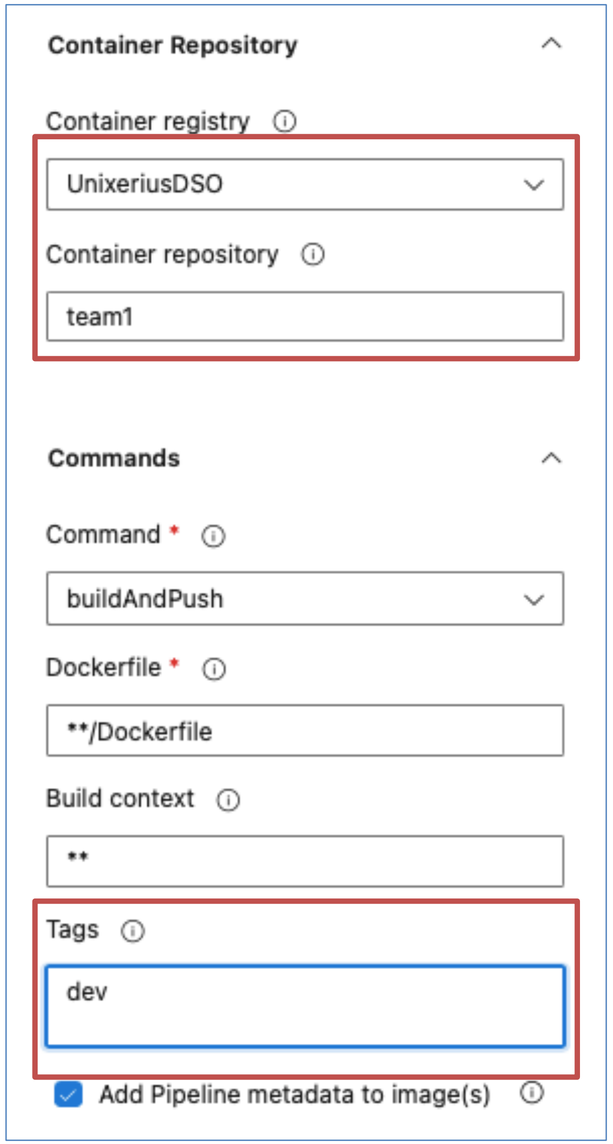
Docker build and push

- If the pipeline ran OK,
  - It's time to build the image.
- Go to the editor again,
  - Make sure you're on "dev"!
  - Open the wizard again.
  - Select the same Docker task.



Docker build and push

- Chose "*BuildAndPush*" as command.
- Chose the "*unixeriusdso*" registry.
- Set repository to "team1",
  - Adjust for your team!
- Set tags to "dev",
- Click "add".



Docker build + push

- Your code should be ->

- Save and run.
  - Building takes 8-10 mins.

```yaml
trigger:
- manual

pool:
  vmImage: ubuntu-latest

steps:
Settings
- task: Docker@2
  inputs:
    containerRegistry: 'UnixeriusDSO'
    command: 'login'
Settings
- task: Docker@2
  inputs:
    containerRegistry: 'UnixeriusDSO'
    repository: 'team3'
    command: 'buildAndPush'
    Dockerfile: '**/Dockerfile'
    tags: 'dev'
Settings
- task: Docker@2
  inputs:
    containerRegistry: 'UnixeriusDSO'
    command: 'logout'
```

Run on Azure WebApp

- Your team already has a WebApp!
  - Adjust for the right team name.

http://unixeriusdso-team1.azurewebsites.net/

Run on Azure WebApp

- Go back to the pipeline editor.
  - Make sure you're on the "dev" branch!
- At the bottom, we will add a block of code.
  - This tells Azure WebApp to load your container.

The code

- Is also available as "*pipeline-step1-build-run.yml*".
  - The dashes shown below are a <u>single dash!</u>

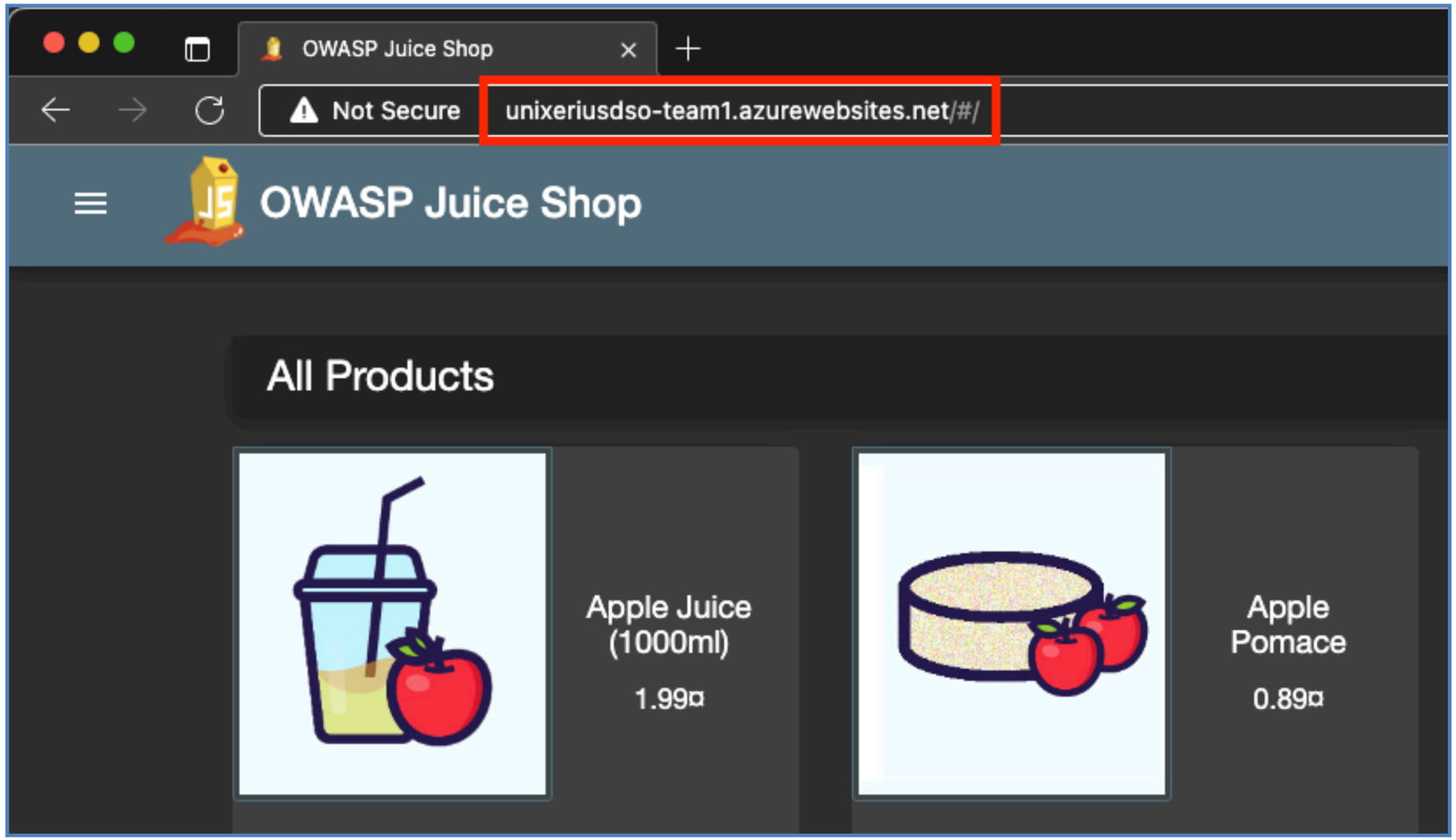
```
- task: AzureWebAppContainer@1
  inputs:
    azureSubscription: 'Azure Unixerius Learning'
    appName: 'unixeriusdso-team1'
    containers: 'unixeriusdso.azurecr.io/team1:dev'
    appSettings: '-Port 3000'
    configurationStrings: '-acrUseManagedIdentityCreds true'
```

Deployment to Dev!

- If you run the pipeline again, it will:
  - Build and push your image to ACR.
  - Run your container as WebApp.

- After deployment, it will take a few minutes.
  - Our WebApp instances are a bit slow. 😉

Deployment to Dev!



Checkpoint!

- Does everyone have:
  - A pipeline on the "dev" branch.
  - Which builds and pushes to ACR?
  - Which runs the container?

- Have you tested this?

Our "bingo" card

DevOps	Intro	Work IRL	AzDO	SDLC	Juice!	
DevOps	Agile	Git	Virtual	Contain	CI/CD	
DevSecOps	App test	DSO	Vulns	SCA	TModel	
DevSecOps	SAST	Secrets	PROD			
DevSecOps	VulnScan	Pentest	DAST	WAF		

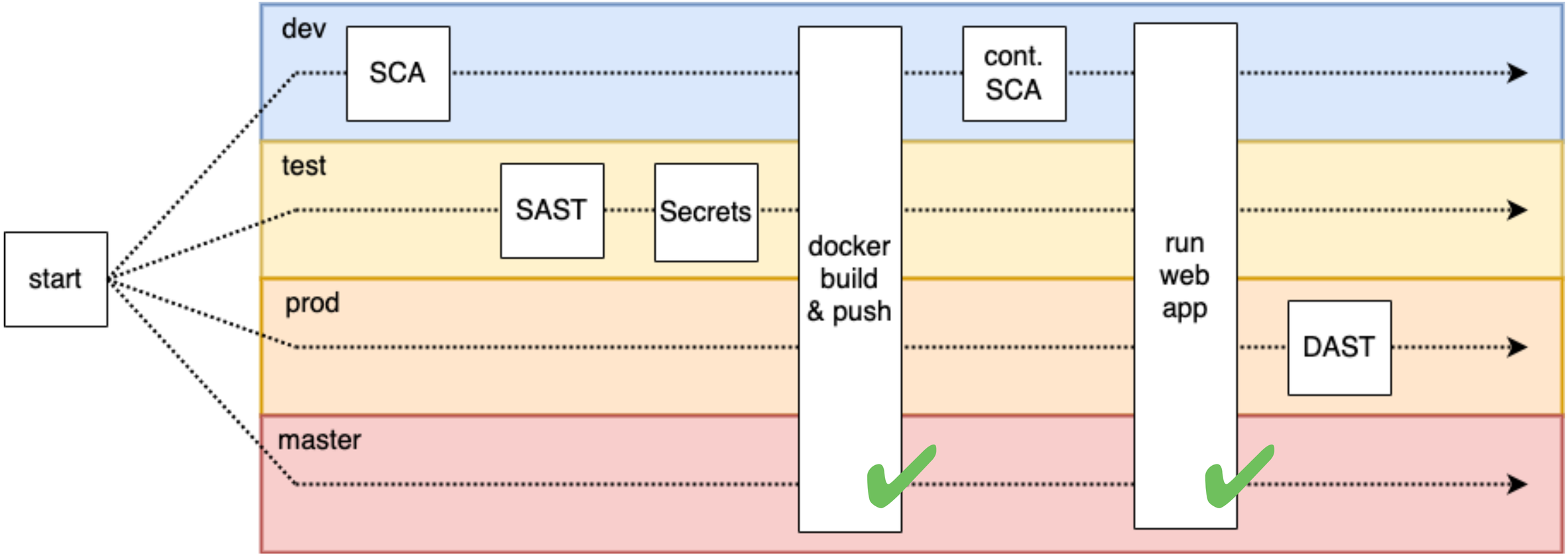
10. Lab: Quick cleanup

I have a spoiler file.

- Available as "*pipeline-step1-build-run.yml*".
  - It prepares you for "stages" and more.

- Use it for your "dev" pipeline.
  - Replace the "team1" with your team.

Our final pipeline goal



Checkpoint!

- Does everyone have:
  - My spoilers as their pipeline?
  - Does it still build and deploy?

- Have you tested this?

Closing

What have we achieved?

- We practiced with Git.
- We ran JuiceShop in Docker, locally.
- We made our first pipeline.
- We ran JuiceShop on Azure, via CICD.

Tomorrow

- We will automate functional testing.
- We will look into software vulnerabilities,
  - DevSecOps fundamental concepts, and
  - Threat modelling.

Reference materials

Resources

- Understanding the TCO of "serverless"
- ArgoCD for beginners
- In-depth: So you think you know Git?
- In-depth: So you think you know Git? Part 2