DIRECTIONS
4 PARTNERS

DIRECTIONS4PARTNERS VIRTUAL 2020

3-5 November 2020

LIGHTNING FAST BC COMPILER IMAGE

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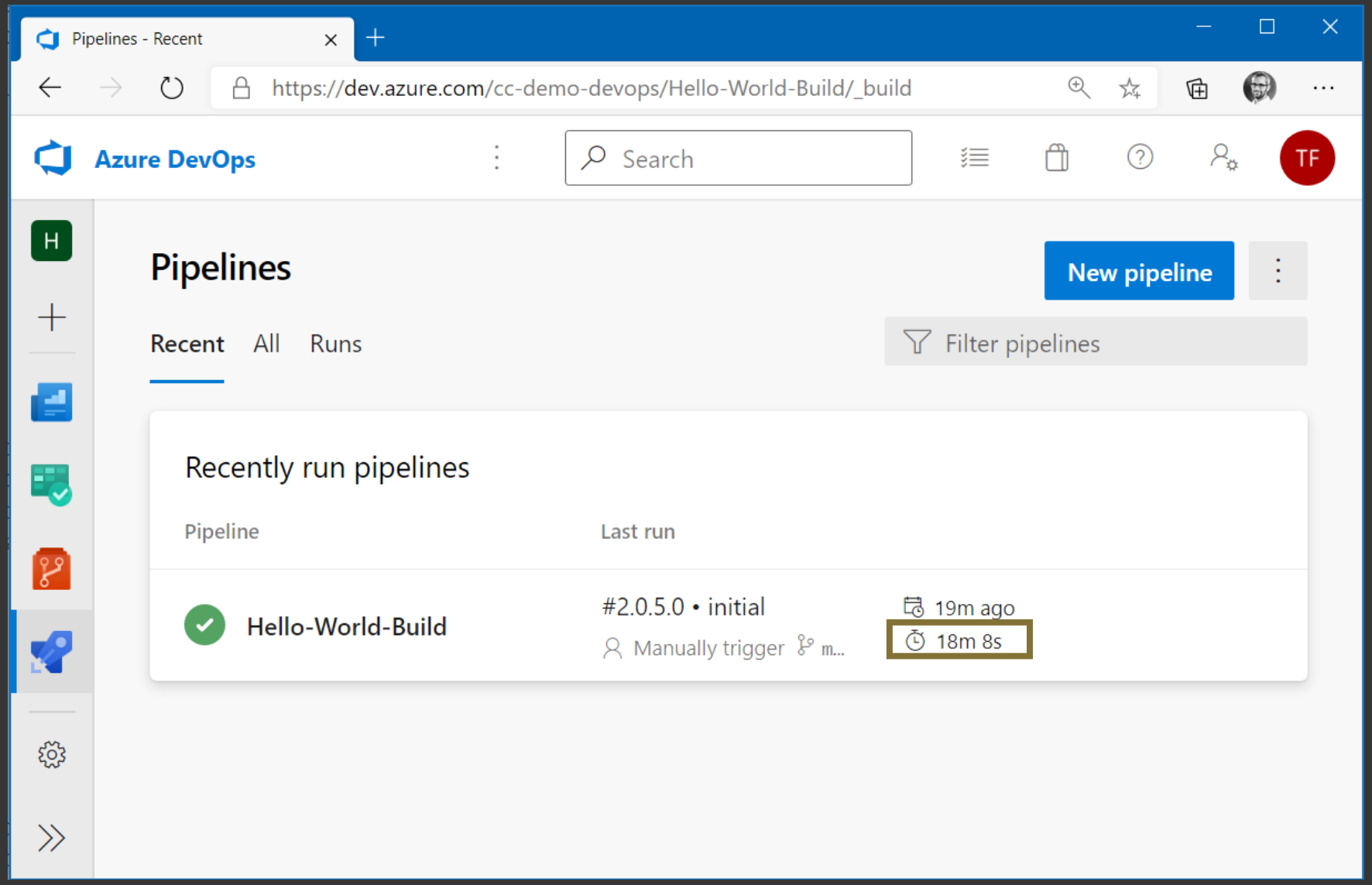
COSMO CONSULT

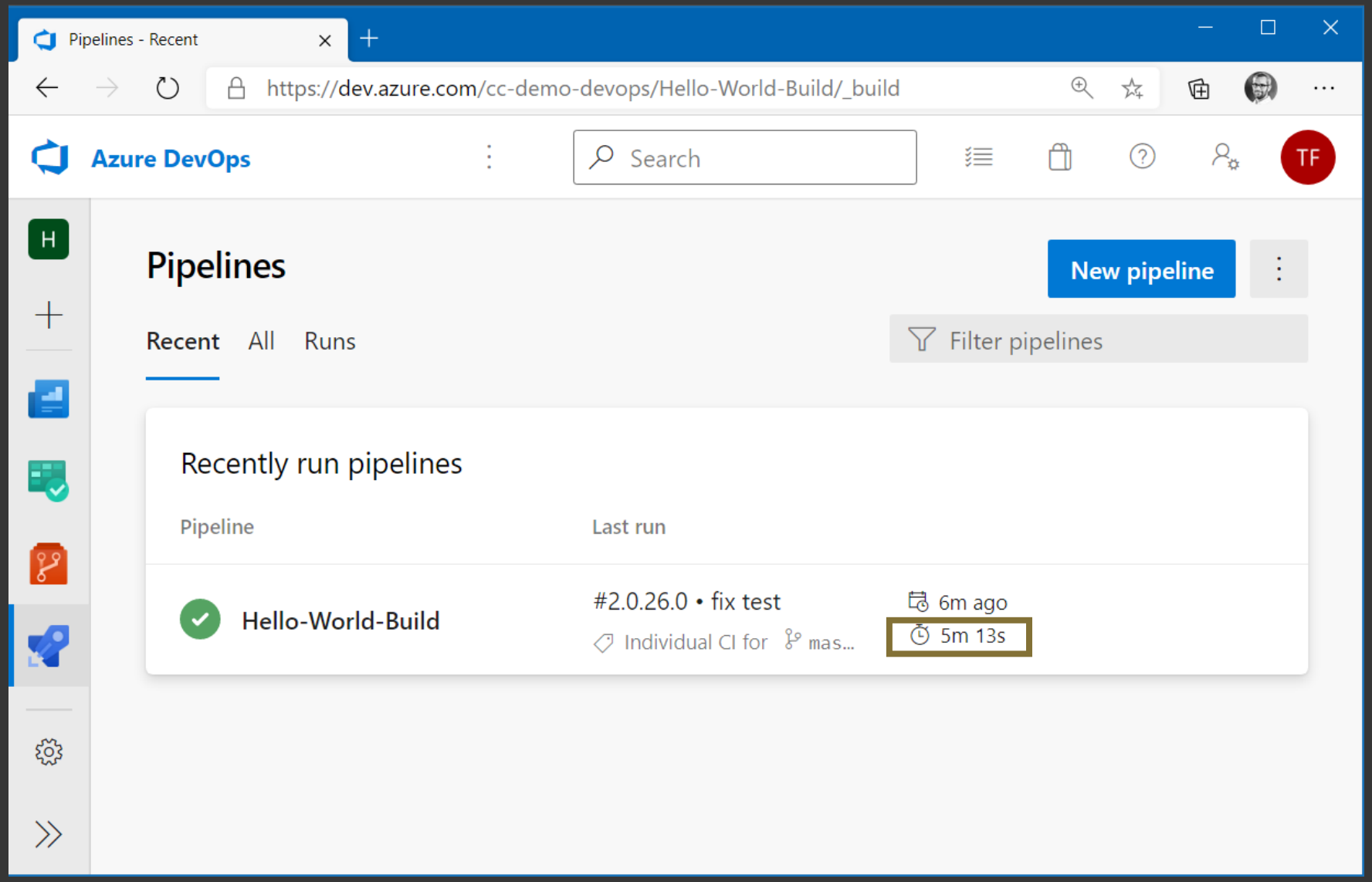
Business-Software for People

WHY?



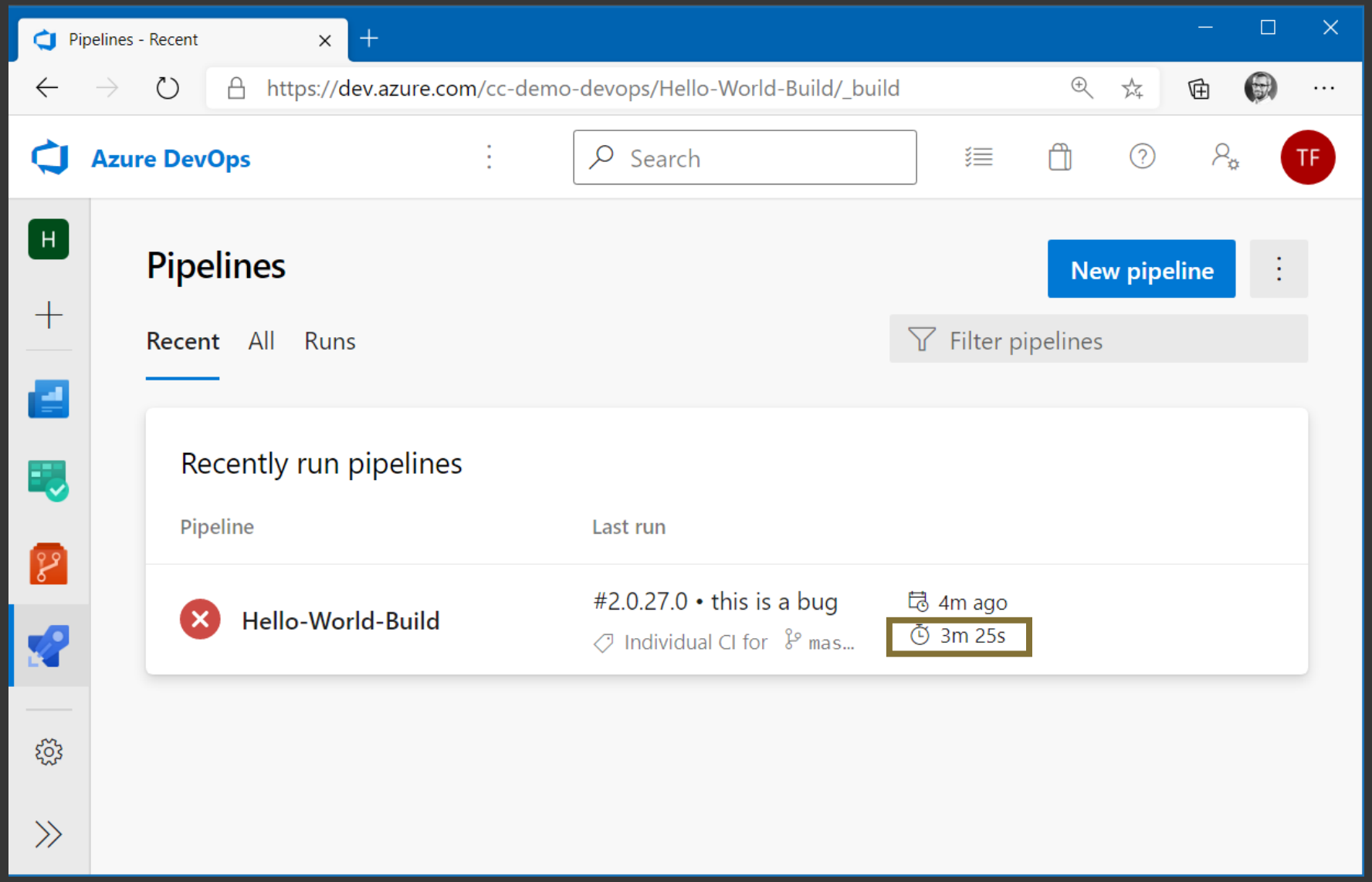
Standard agent on Azure (free): no caching

WHY?

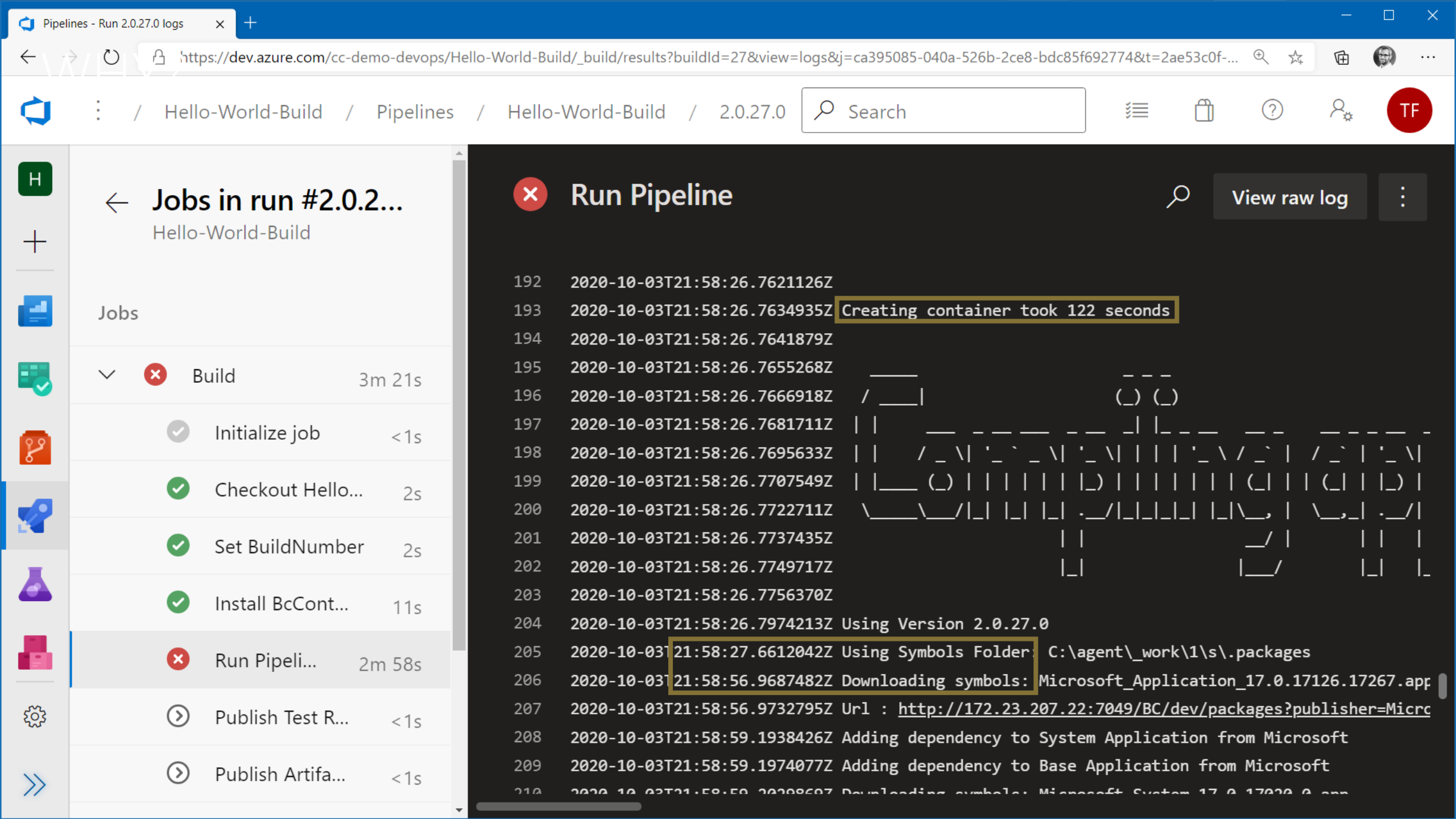


Self-hosted agent: caching

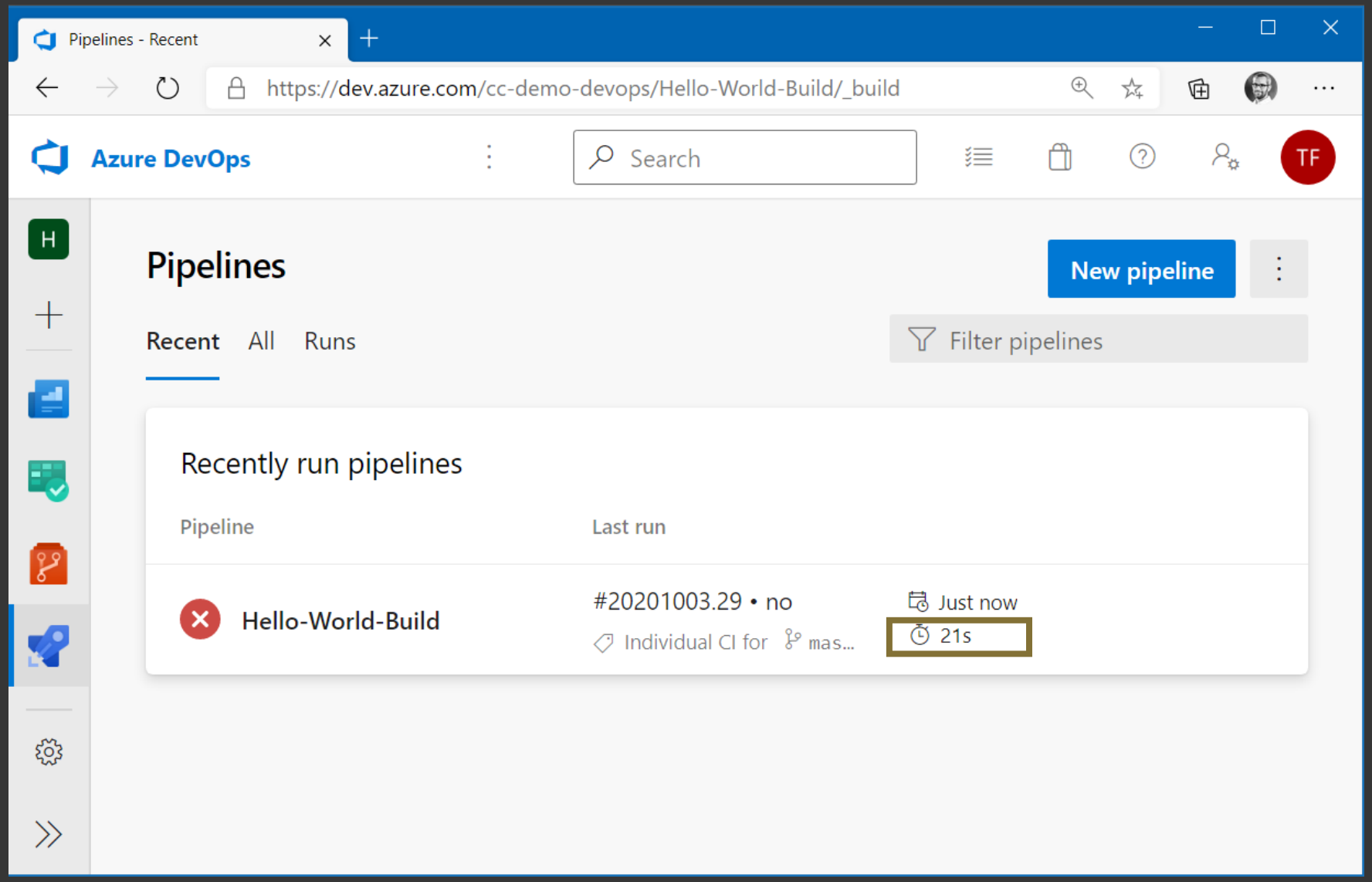
WHY?



Self-hosted agent: caching

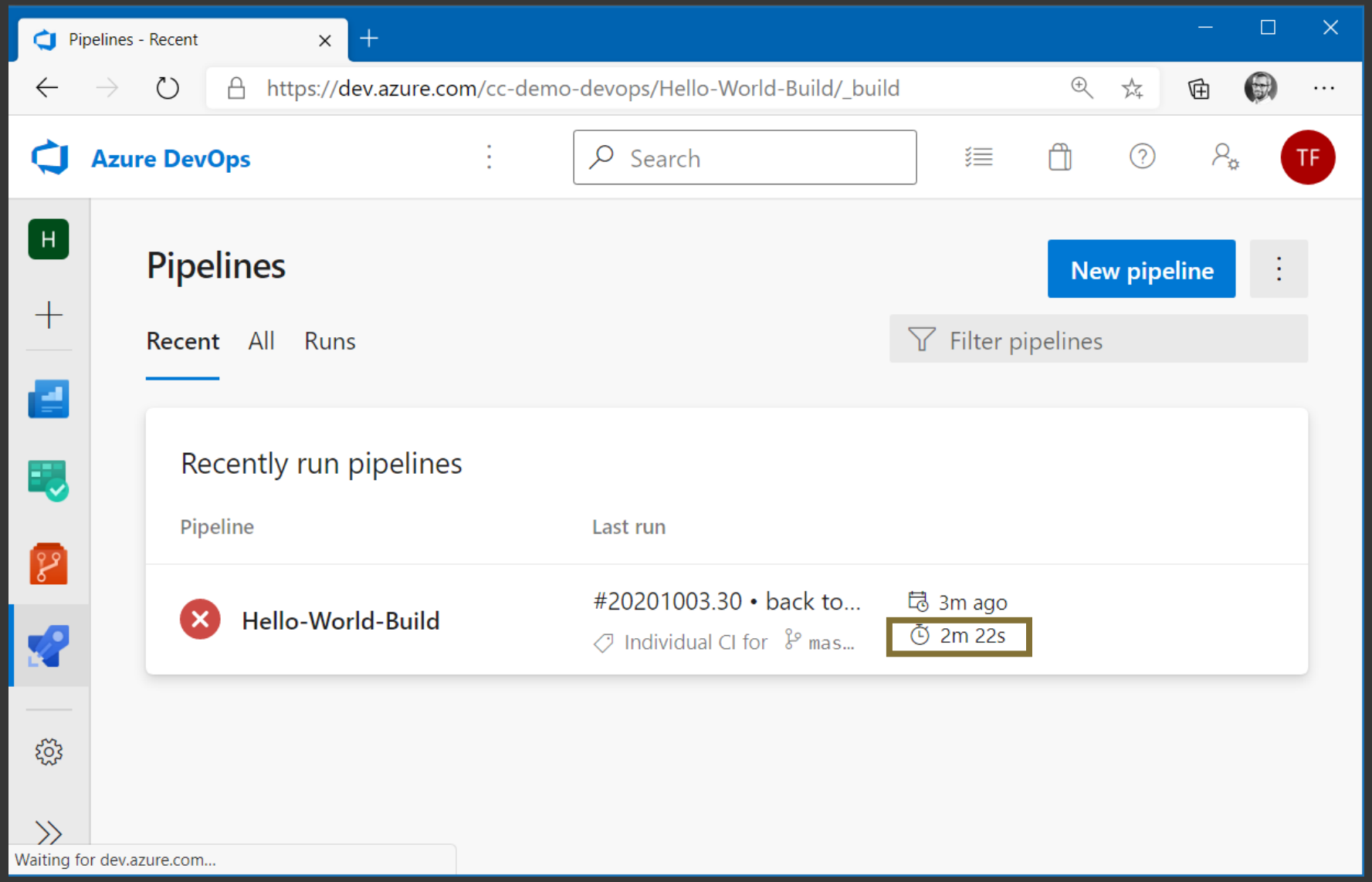

Pipelines - Run 2.0.27.0 logs
https://dev.azure.com/cc-demo-devops/Hello-World-Build/_build/results?buildId=27&view=logs&j=ca395085-040a-526b-2ce8-bdc85f692774&t=2ae53c0f-...
Hello-World-Build / Pipelines / Hello-World-Build / 2.0.27.0
Search
TF
Jobs in run #2.0.2...
Hello-World-Build
Jobs
Build 3m 21s
Initialize job <1s
Checkout Hello... 2s
Set BuildNumber 2s
Install BcCont... 11s
Run Pipeli... 2m 58s
Publish Test R... <1s
Publish Artifa... <1s
Run Pipeline
View raw log
192 2020-10-03T21:58:26.7621126Z
193 2020-10-03T21:58:26.7634935Z Creating container took 122 seconds
194 2020-10-03T21:58:26.7641879Z
195 2020-10-03T21:58:26.7655268Z
196 2020-10-03T21:58:26.7666918Z
197 2020-10-03T21:58:26.7681711Z
198 2020-10-03T21:58:26.7695633Z
199 2020-10-03T21:58:26.7707549Z
200 2020-10-03T21:58:26.7722711Z
201 2020-10-03T21:58:26.7737435Z
202 2020-10-03T21:58:26.7749717Z
203 2020-10-03T21:58:26.7756370Z
204 2020-10-03T21:58:26.7974213Z Using Version 2.0.27.0
205 2020-10-03T21:58:27.6612042Z Using Symbols Folder: C:\agent_work\1\s\.packages
206 2020-10-03T21:58:56.9687482Z Downloading symbols: Microsoft_Application_17.0.17126.17267.app
207 2020-10-03T21:58:56.9732795Z Url : http://172.23.207.22:7049/BC/dev/packages?publisher=Micro
208 2020-10-03T21:58:59.1938426Z Adding dependency to System Application from Microsoft
209 2020-10-03T21:58:59.1974077Z Adding dependency to Base Application from Microsoft

WHY?



Custom compiler on self-hosted agent

WHY?



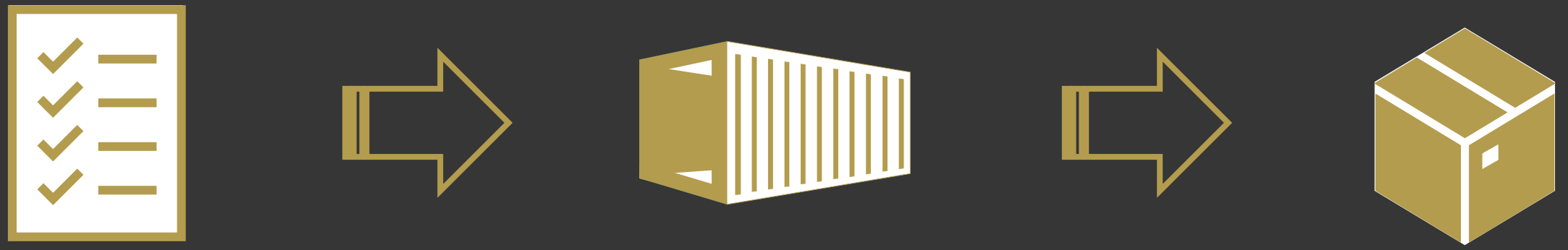
Custom compiler on standard agent on Azure (free)

HOW?

1. Use nanoserver base image* and process isolation as that starts fastest
2. Have everything (compiler, symbols, assemblies) ready in the image, so you don't need to wait for BC to start
3. Have nothing else in the image, so it is smaller and quicker to pull

* Only possible if you don't have custom .net

HOW? – A QUICK PRIMER ON DOCKER IMAGE BUILDS

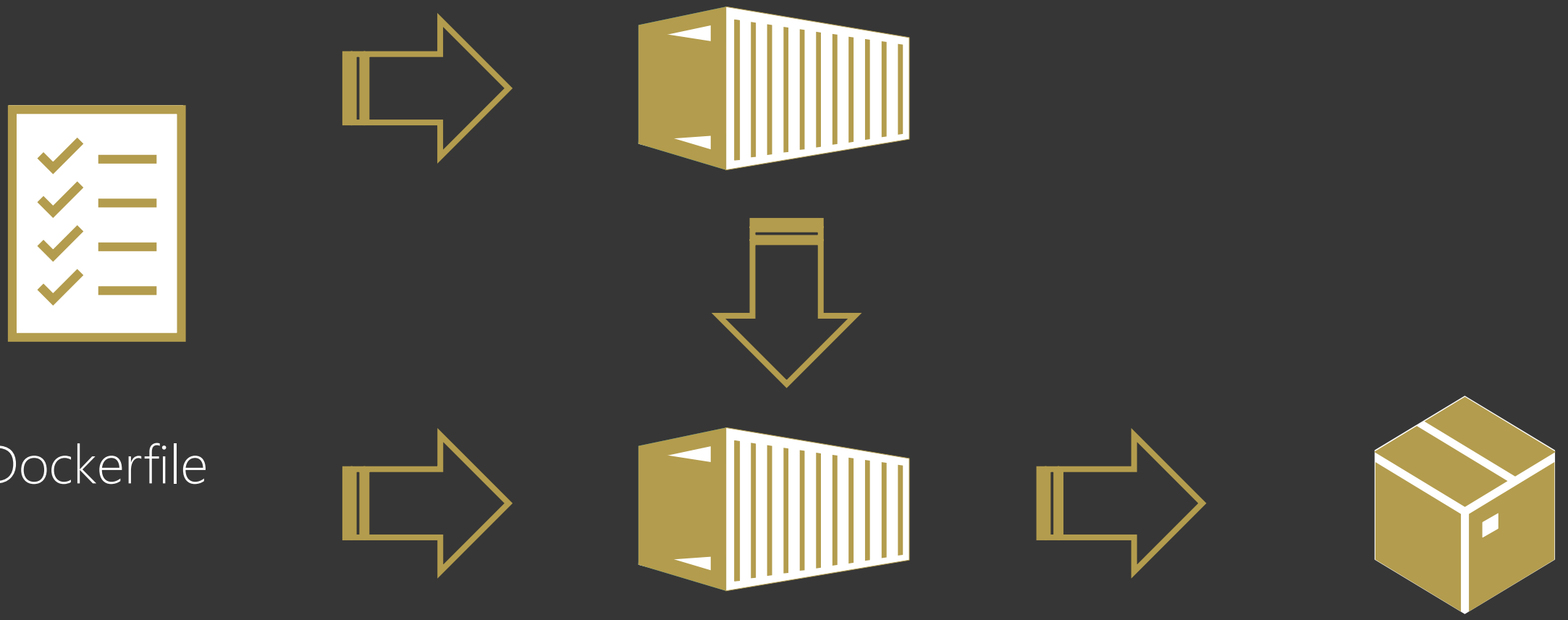


Dockerfile

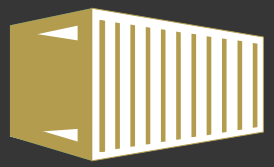
Build
(runs a container
following instructions
in Dockerfile)

Image

HOW? – MULTI-STAGE DOCKER IMAGE BUILDS

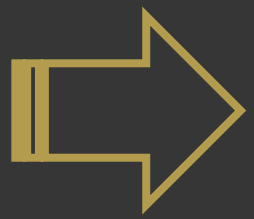


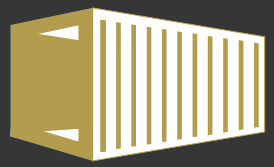
HOW? – MULTI-STAGE DOCKER IMAGE BC COMPILER



First stage

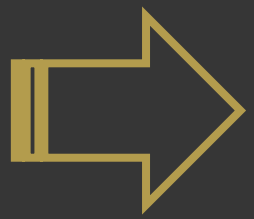
1. navcontainerhelper
2. Artifact download
3. Collect prereqs, vsix, dependencies, assemblies
4. Expand vsix
5. Copy everything in place

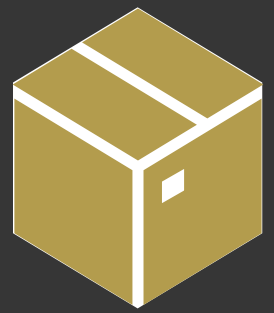




Second stage

1. Copy extension, artifacts, assemblies
2. Create dummy ruleset
3. Prepare compiler call depending on whether sources contain .netpackages





Windows Server Core

Nano Server (if no .net)

File Edit Selection View Go Run Terminal Help — cosmo-compiler - Visual Studio Code - Insiders

Dockerfile

Dockerfile > ...

NAVRockClimber, 2 months ago | 2 authors (You and others)

STAGE 1

```
1  # escape=`
2  ARG BASEVERSION
3  ARG BASETYPE
4  FROM mcr.microsoft.com/windows/servercore:$BASEVERSION as mother
5  ARG NCHVERSION
6  SHELL ["powershell", "-Command", "$ErrorActionPreference = 'Stop';"]
7
8  RUN Install-PackageProvider -Name NuGet -MinimumVersion 2.8.5.201 -Force; `
9      Install-Module navcontainerhelper -MinimumVersion $env:NCHVERSION -MaximumVersion $env:NCHVERSION -Force;
10
11 ARG BCTYPE
12 ARG BCCOUNTRY
13 ARG BCVERSION
14 ARG BCSTORAGEACCOUNT=bcartifacts
15 ARG BCSASTOKEN
16
17 RUN Import-Module navcontainerhelper; `
18     Download-Artifacts -artifactUrl (Get-BCArtifactUrl -type $env:BCTYPE -country $env:BCCOUNTRY -version $env:BCVERSION -storageAccount $env:BCSTORAGEACCOUNT
       -sasToken $env:BCSASTOKEN) -includePlatform;
19
20 RUN New-Item -Path c:\artifacts -ItemType Directory; `
21     New-Item -Path c:\bin -ItemType Directory; `
22     $basePath = Get-ChildItem "C:\bcartifacts.cache\$env:BCTYPE\$($env:BCVERSION)*"; `
23     Start-Process "$basePath\platform\Prerequisite` Components\Open` XML` SDK` 2.5` for` Microsoft` Office\OpenXMLSDKv25.msi" "/qn" -PassThru | Wait-Process; `
24     Copy-Item "C:\Program` Files` `(x86`)\Open` XML` SDK\V2.5\lib" "C:\assemblies\OpenXMLSdk" -Recurse; `
25     Copy-Item "$basePath\platform\ModernDev\program` files\Microsoft` Dynamics` NAV\*\AL` Development` Environment\ALLanguage.vsix" "$basePath\ALLanguage.zip"; `
26     Copy-Item "$basePath\platform\ModernDev\program` files\Microsoft` Dynamics` NAV\*\AL` Development` Environment\System.app" "C:\artifacts\System.app"; `
27     Get-ChildItem -Path "$basePath\$env:BCCOUNTRY" -Filter *.app -Recurse | % { Copy-Item $_.FullName  "C:/artifacts/" }; `
28     Expand-Archive "$basePath\ALLanguage.zip" "C:\alc"; `
29     Copy-Item "$basePath\platform\LegacyDlls\program` files\Microsoft` Dynamics` NAV\*\RoleTailored` Client" "C:\assemblies\RoleTailoredClient" -Recurse; `
30     Copy-Item "$basePath\platform\ServiceTier\program` files\Microsoft` Dynamics` NAV\*\Service" "C:\assemblies\Service" -Recurse; `      You, 2 months ago • Initi
31     Copy-Item "$basePath\platform\Test` Assemblies\Mock` Assemblies" "C:\assemblies\MockAssemblies" -Recurse;
32
```

master ⟳ ⊗ 0 ⚠ 0 Live Share — You, 2 months ago Ln 30, Col 98 Spaces: 4 UTF-8 CRLF Dockerfile

File Edit Selection View Go Run Terminal Help — cosmo-compiler - Visual Studio Code - Insiders

Dockerfile

Dockerfile > ...

STAGE 2

```
33  FROM mcr.microsoft.com/windows/$BASETYPE:$BASEVERSION
34  COPY --from=mother c:/alc/extension/bin c:/bin
35  COPY --from=mother C:/artifacts C:/symbols
36  COPY --from=mother C:/assemblies c:/assemblies
37  COPY Dummy.ruleset.json c:\dummy.ruleset.json
38  USER ContainerAdministrator
39  RUN if NOT exist c:\windows\assembly ( mkdir c:\windows\assembly )
40  USER ContainerUser
41  ENV rulesetfile='c:\dummy.ruleset.json'
42  CMD if not exist c:\src\.netpackages `
43      (c:\bin\win32\alc.exe `
44      /project:c:\src `
45      /packagecachepath:c:\symbols `
46      /out:c:\src\app.app `
47      /errorlog:c:\src\alc.log `
48      /loglevel:Warning `
49      /ruleset:%rulesetfile% `
50      /analyzer:c:\bin\Analyzers\Microsoft.Dynamics.Nav.CodeCop.dll `
51      /analyzer:c:\bin\Analyzers\Microsoft.Dynamics.Nav.AppSourceCop.dll `
52      /analyzer:c:\bin\Analyzers\Microsoft.Dynamics.Nav.UICop.dll `
53      /assemblyprobingpaths:"c:\assemblies\OpenXMLSdk","C:\assemblies\RoleTailoredClient","C:\assemblies\Service","C:\assemblies\MockAssemblies",
        "c:\windows\assembly") else `
54      (c:\bin\win32\alc.exe `
55      /project:c:\src `
56      /packagecachepath:c:\symbols `
57      /out:c:\src\app.app `
58      /errorlog:c:\src\alc.log `
59      /loglevel:Warning `
60      /ruleset:%rulesetfile% `
61      /analyzer:c:\bin\Analyzers\Microsoft.Dynamics.Nav.CodeCop.dll `
62      /analyzer:c:\bin\Analyzers\Microsoft.Dynamics.Nav.AppSourceCop.dll `
63      /analyzer:c:\bin\Analyzers\Microsoft.Dynamics.Nav.UICop.dll `
64      /assemblyprobingpaths:"c:\assemblies\OpenXMLSdk","C:\src\.netpackages","C:\assemblies\RoleTailoredClient","C:\assemblies\Service",
        "C:\assemblies\MockAssemblies","c:\windows\assembly")
```

master ⟳ ⊗ 0 ⚠ 0 Live Share — You, 2 months ago Ln 30, Col 98 Spaces: 4 UTF-8 CRLF Dockerfile

BUILD THE IMAGE

```
docker build
            -t tobiasfenster/cosmo-compiler:17.0-onprem-de-1809
            --build-arg BASEVERSION=1809
            --build-arg BASETYPE=nanoserver
            --build-arg NCHVERSION=0.7.0.26
            --build-arg BCTYPE=OnPrem
            --build-arg BCCOUNTRY=de
            --build-arg BCVERSION=17.0
            .
```

PowerShell

PowerShell

```
PS [MUE22TF08982NB1]:C:\Users\tfenster8982\GitHub\cosmo-compiler> docker build -t tobiasfenster/cosmo-compiler:17.0-onprem-de-1809 --build-arg BASEVERSION=1809 --build-arg BASETYPE=nanoserver --build-arg NCHVERSION=0.7.0.26 --build-arg BCTYPE=OnPrem --build-arg BCCOUNTRY=de --build-arg BCVERSION=17.0 .
```

USE THE IMAGE

```
C:\Users\tfenster8982\azuredevops\Hello-World-Build>

docker run
       -v $(pwd)\app:c:\src
       --name alcnano
       --rm tobiasfenster/cosmo-compiler:17.0-onprem-de-1809
```

PowerShell

PowerShell

```
PS [MUE22TF08982NB1]:C:\Users\tfenster8982\azuredevops\Hello-World-Build> docker run -v "$(pwd)\app:c:\src" --name alcnano --rm t
obiasfenster/cosmo-compiler:17.0-onprem-de-1809
```

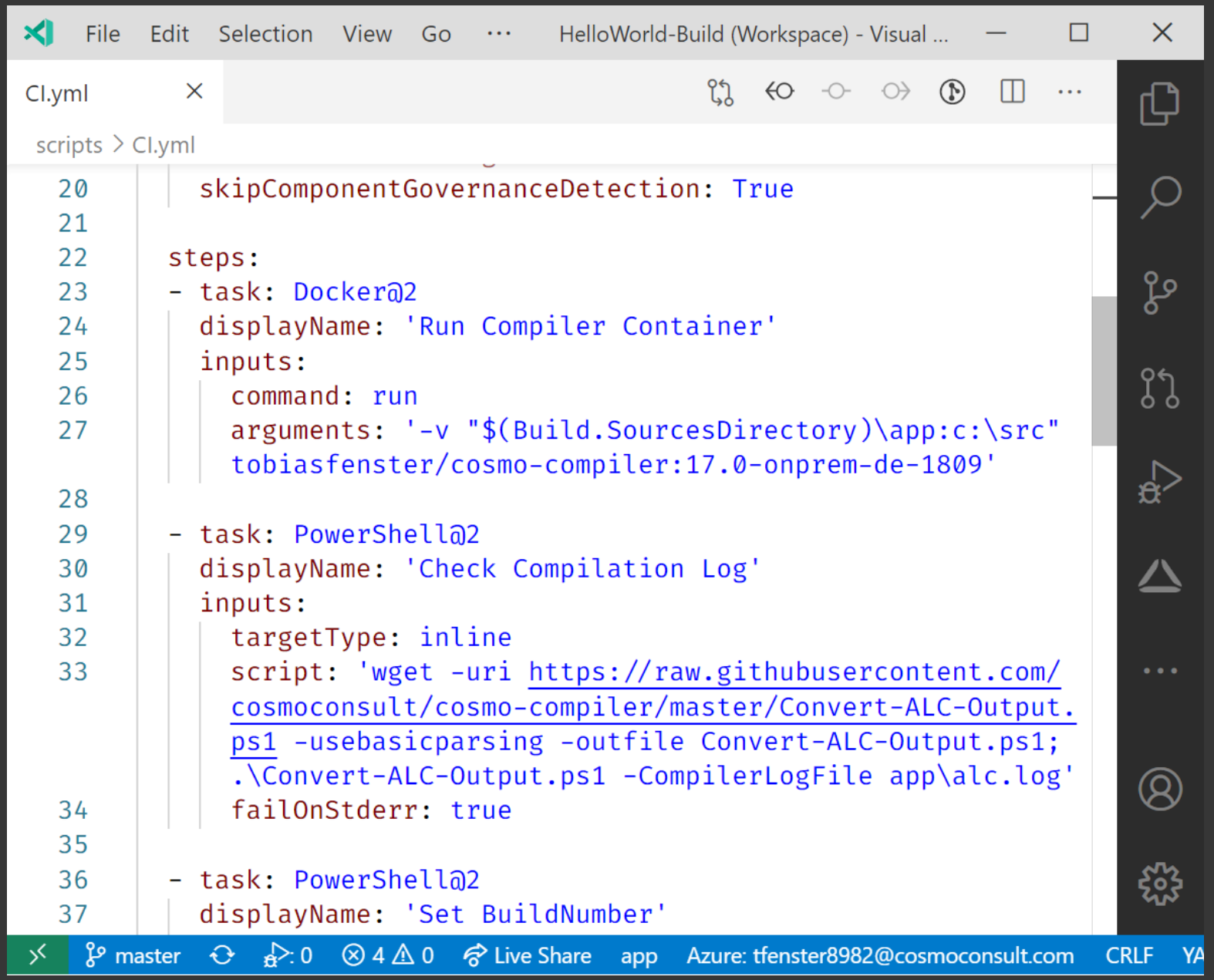
AND IF WE HAVE AN ERROR?

PowerShell

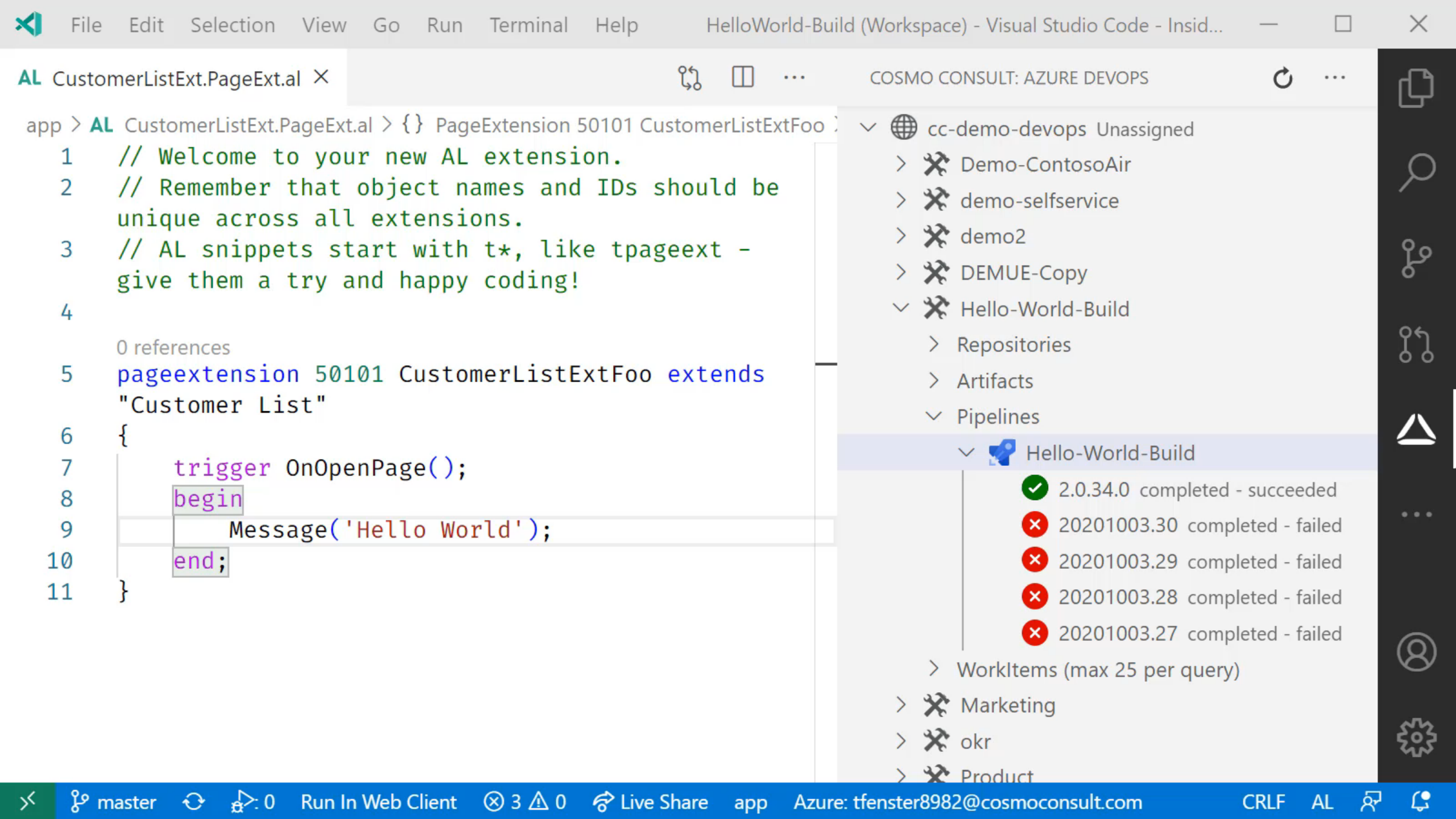
PowerShell

```
PS [MUE22TF08982NB1]:C:\Users\tfenster8982\azuredevops\Hello-World-Build> docker run -v "$(pwd)\app:c:\src" --name alcnano --rm t
obiasfenster/cosmo-compiler:17.0-onprem-de-1809
```

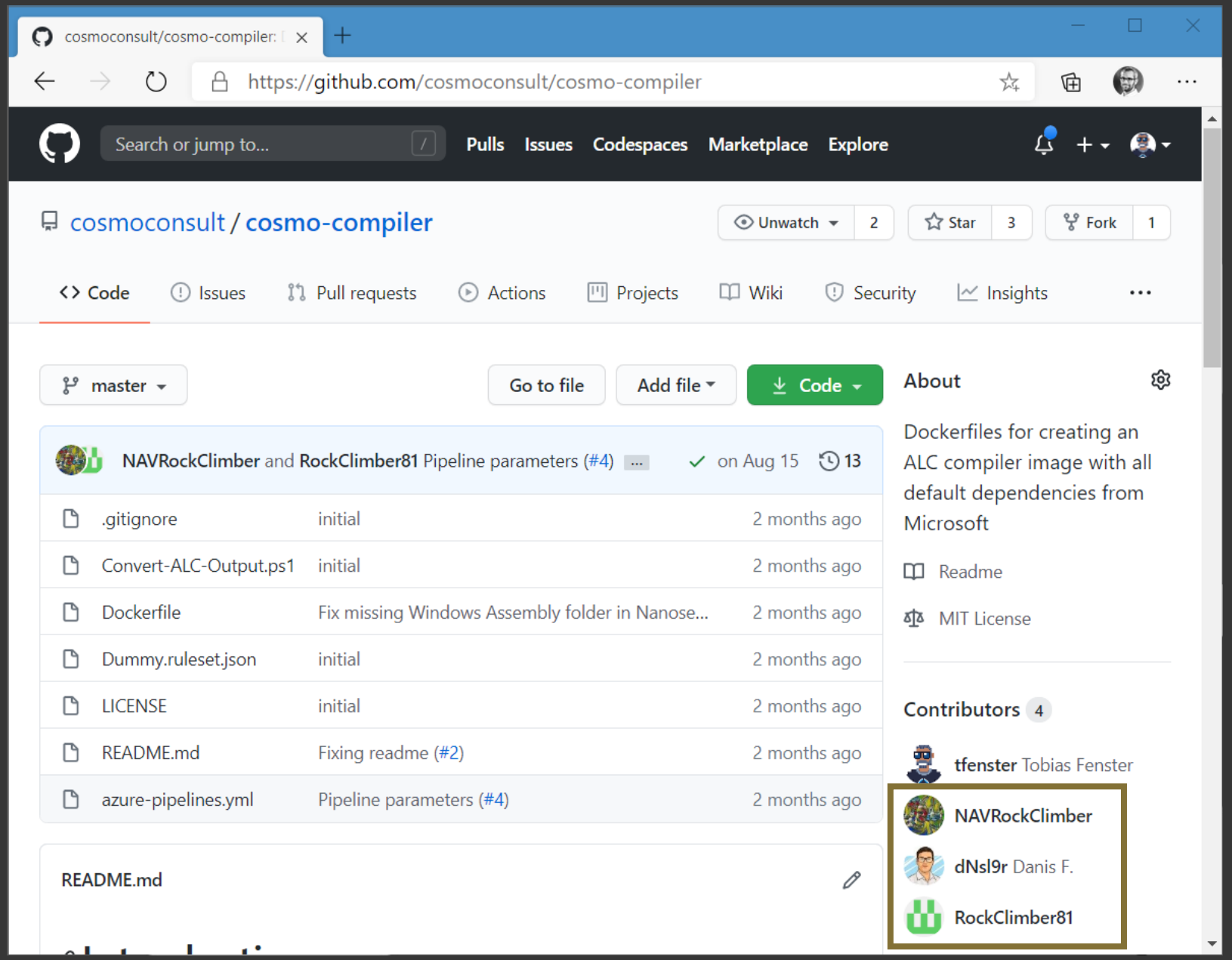
THE PIPELINE



PUTTING IT TOGETHER


File Edit Selection View Go Run Terminal Help
HelloWorld-Build (Workspace) - Visual Studio Code - Insid...
AL CustomerListExt.PageExt.al
app > AL CustomerListExt.PageExt.al > { } PageExtension 50101 CustomerListExtFoo
1 // Welcome to your new AL extension.
2 // Remember that object names and IDs should be unique across all extensions.
3 // AL snippets start with t*, like tpageext - give them a try and happy coding!
4
0 references
5 pageextension 50101 CustomerListExtFoo extends "Customer List"
6 {
7 trigger OnOpenPage();
8 begin
9 Message('Hello World');
10 end;
11 }
COSMO CONSULT: AZURE DEVOPS
cc-demo-devops Unassigned
Demo-ContosoAir
demo-selfservice
demo2
DEMUE-Copy
Hello-World-Build
Repositories
Artifacts
Pipelines
Hello-World-Build
2.0.34.0 completed - succeeded
20201003.30 completed - failed
20201003.29 completed - failed
20201003.28 completed - failed
20201003.27 completed - failed
WorkItems (max 25 per query)
Marketing
okr
Product
master
Run In Web Client
3 0
Live Share
app
Azure: tfenster8982@cosmoconsult.com
CRLF
AL

COMMUNITY!


cosmoconsult/cosmo-compiler:
https://github.com/cosmoconsult/cosmo-compiler
Search or jump to...
Pulls
Issues
Codespaces
Marketplace
Explore
cosmoconsult / cosmo-compiler
Unwatch 2
Star 3
Fork 1
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
master
Go to file
Add file
Code
NAVRockClimber and RockClimber81 Pipeline parameters (#4) ... on Aug 15 13
.gitignore initial 2 months ago
Convert-ALC-Output.ps1 initial 2 months ago
Dockerfile Fix missing Windows Assembly folder in Nanose... 2 months ago
Dummy.ruleset.json initial 2 months ago
LICENSE initial 2 months ago
README.md Fixing readme (#2) 2 months ago
azure-pipelines.yml Pipeline parameters (#4) 2 months ago
README.md
About
Dockerfiles for creating an ALC compiler image with all default dependencies from Microsoft
Readme
MIT License
Contributors 4
tfenster Tobias Fenster
NAVRockClimber
dNsl9r Danis F.
RockClimber81

COSMO CONSULT

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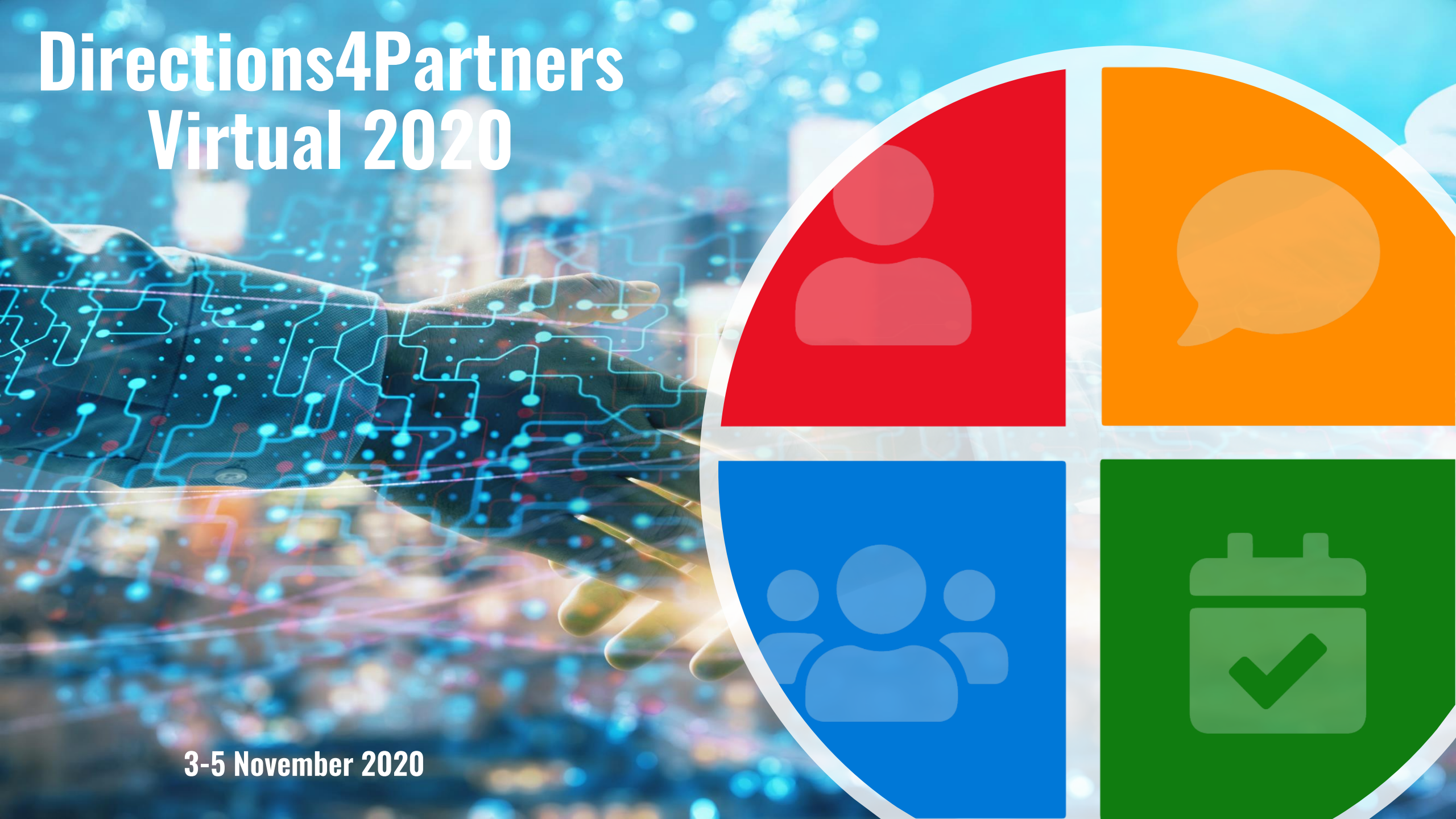
THANK YOU

FOR YOUR TIME

Directions4Partners Virtual 2020



3-5 November 2020