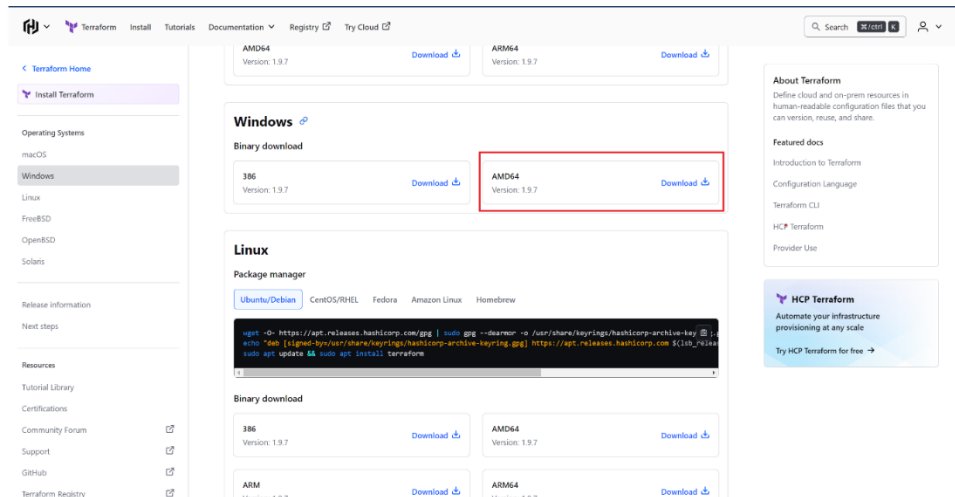


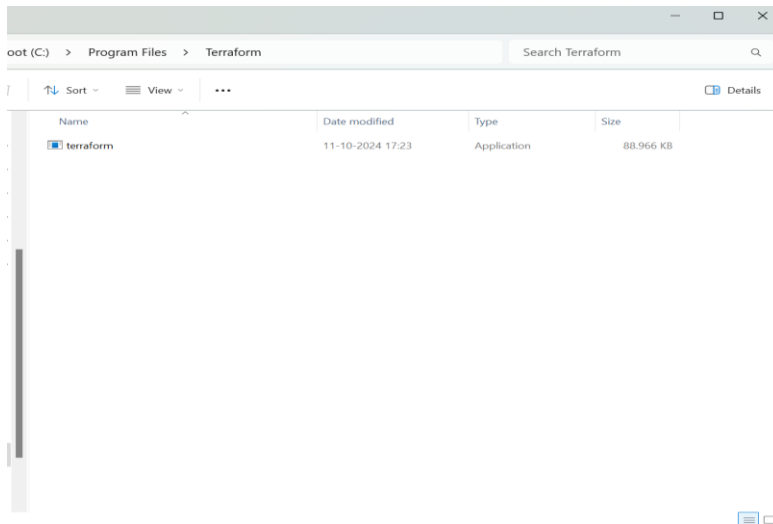
Terraform guideline

Terraform

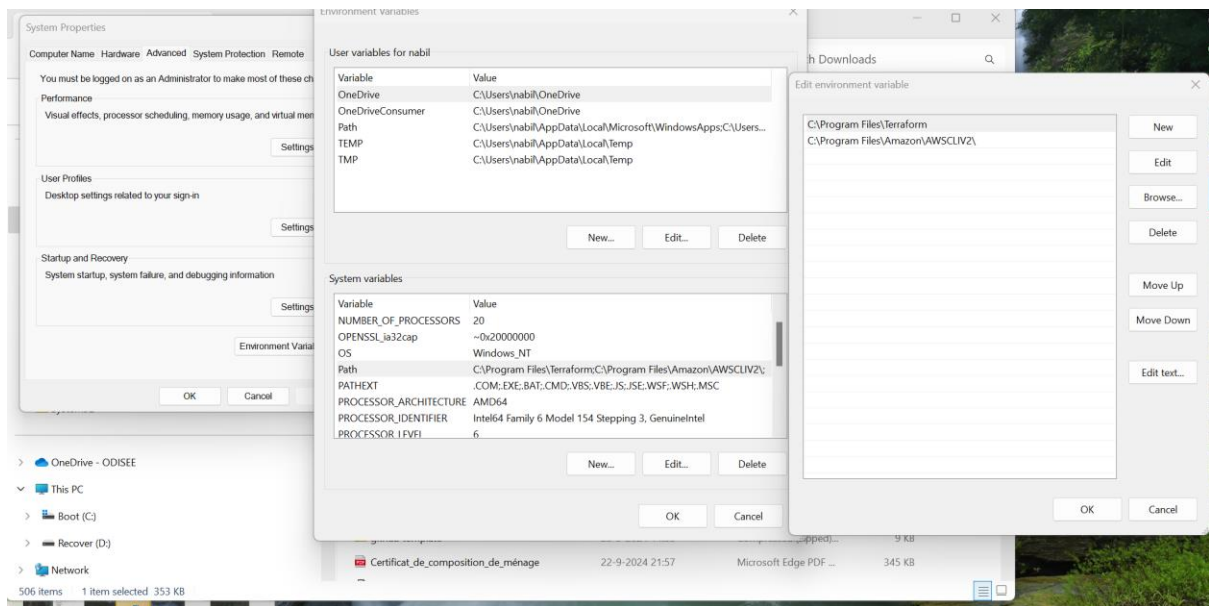
Stap 1: Download terraform (hangt af pc tot pc)



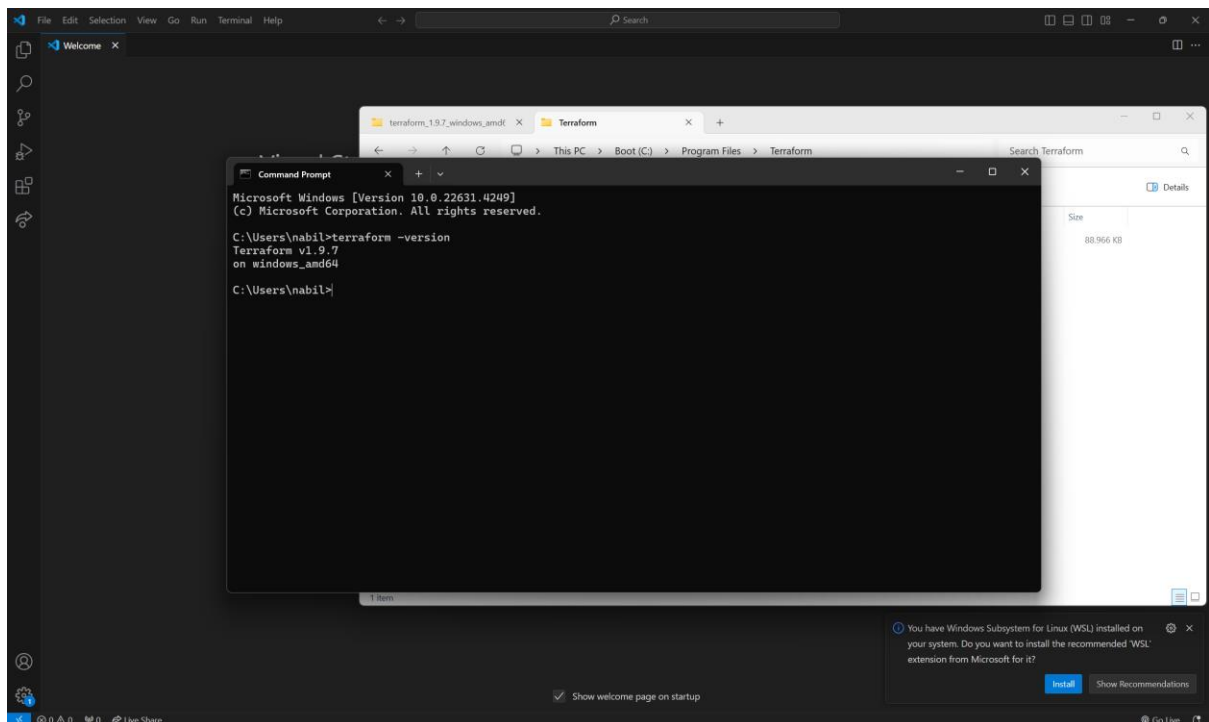
Stap 2: Verplaats de terraform.exe naar C:\Program Files\Terraform (De Terraform folder moet gemaakt worden)



Ga naar edit the system environment variables klik op environment variables dan zie je Path staan bij system variables klik erop en zorg dat je de bestand pakt waar je de terraform.exe hebt geplaatst dus in deze geval C:\Program Files\Terraform



Zoek naar command prompt en check met `terraform -version` als je de juiste versie hebt gedownload(zie foto beneden)



Dit moet ook gebeuren voor de `aws cli` file hierbij de [link](#) om dit te doen volg exact dezelfde stappen als terraform (system environment variables)

▼ Windows

Install and update requirements

- We support the AWS CLI on Microsoft-supported versions of 64-bit Windows.
- Admin rights to install software

Install or update the AWS CLI

To update your current installation of AWS CLI on Windows, download a new installer each time you update to overwrite previous versions. AWS CLI is updated regularly. To see when the latest version was released, see the [AWS CLI version 2 Changelog](#) on [GitHub](#).

1. Download and run the AWS CLI MSI installer for Windows (64-bit):

<https://awscli.amazonaws.com/AWSCLIV2.msi>

Alternatively, you can run the `msiexec` command to run the MSI installer.

```
C:\> msiexec.exe /i https://awscli.amazonaws.com/AWSCLIV2.msi
```

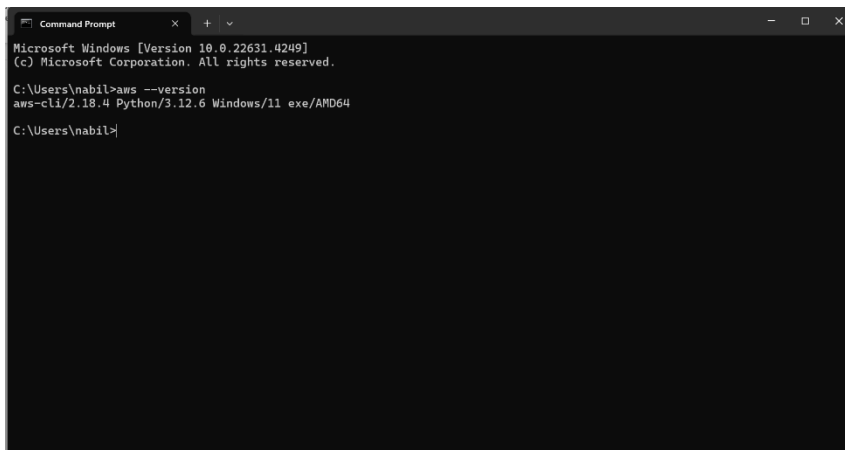
For various parameters that can be used with `msiexec`, see [msiexec](#) on the *Microsoft Docs* website. For example, you can use the `/qn` flag for a silent installation.

```
C:\> msiexec.exe /i https://awscli.amazonaws.com/AWSCLIV2.msi /qn
```

2. To confirm the installation, open the **Start** menu, search for `cmd` to open a command prompt window, and at the command prompt use the `aws --version` command.

```
C:\> aws --version
aws-cli/2.17.20 Python/3.11.6 Windows/10 exe/AMD64 prompt/off
```

Eens dit gedaan ga naar command prompt en check als aws.cli werd gedownload met deze command `aws --version`



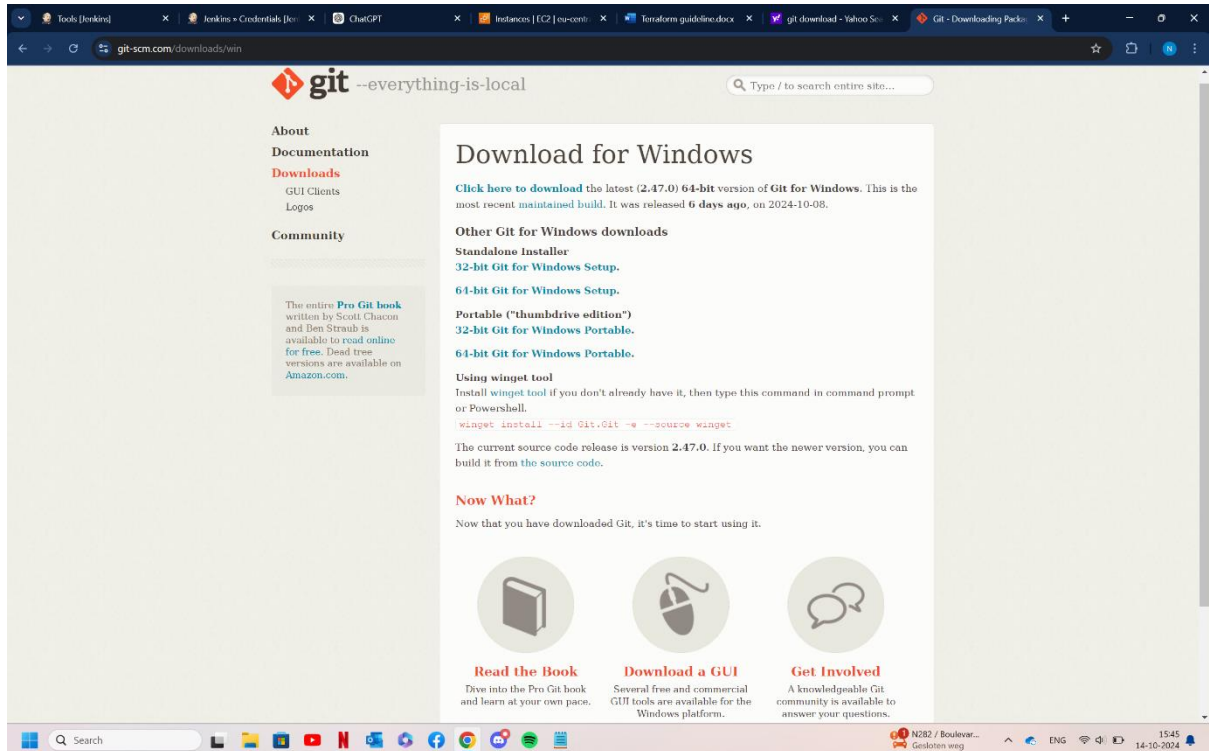
```
Command Prompt
Microsoft Windows [Version 10.0.22631.4249]
(c) Microsoft Corporation. All rights reserved.

C:\Users\nabil>aws --version
aws-cli/2.18.4 Python/3.12.6 Windows/11 exe/AMD64

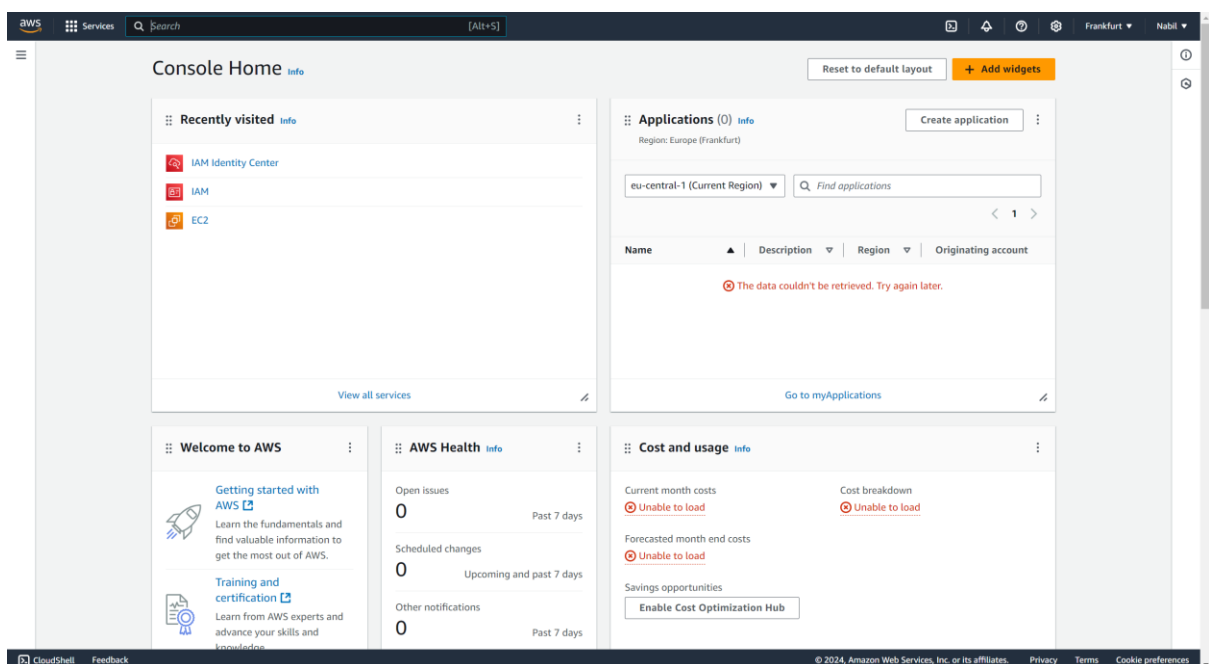
C:\Users\nabil>
```

Download ook git dit zal nodig hebben voor later gebruik (check eerst of je dit al hebt als ja hoeft je deze stuk niet dit check je met `git --version` te zetten op u command prompt)

De link: <https://git-scm.com/downloads/win>



Na dit kan je op aws pagina gaan met deze [link](#) dan klik je op sign up en je logt in



Ps. Maak u geen zorgen dit is gratis en zal geen 1 euro af nemen van u account.

Na dit typt u op de zoekbalk IAM klik je erop en dan klik je op users links in de balk:

The screenshot shows the AWS IAM console interface. On the left, the 'Identity and Access Management (IAM)' sidebar is visible, with a search bar and a list of navigation options including 'Dashboard', 'Access management', 'User groups', 'Users', 'Roles', 'Policies', 'Identity providers', 'Account settings', 'Access reports', and 'Related consoles'. The main content area is titled 'IAM > Users'. It features a banner at the top with the text 'Ready to streamline human access to AWS and cloud apps?' and a 'Manage workforce users' button. Below this, a message states 'Identity Center is enabled. We recommend managing workforce users' access to AWS accounts and cloud applications in Identity Center.' The 'Users (2)' section is highlighted, showing a search bar and a table of users. The table has columns for 'User name', 'Path', 'Group', 'Last activity', 'MFA', 'Password age', 'Console last sign-in', and 'Access key ID'. Two users are listed: 'Jan' and 'Nabil'. The 'Create user' button is highlighted in orange.

	User name	Path	Group	Last activity	MFA	Password age	Console last sign-in	Access key ID
<input type="checkbox"/>	Jan	/	0	2 hours ago	-	-	-	Active - AKIAR
<input type="checkbox"/>	Nabil	/	0	-	-	4 hours	-	-

Daar moet je een user aan maken met **create user** te klikken. (Zonder user kan je geen instance maken)

Kies naam voor je user dan klik je op next

IAM > Users > Create user

Step 1
Specify user details

Step 2
Set permissions

Step 3
Review and create

Specify user details

User details

User name

The user name can have up to 64 characters. Valid characters: A-Z, a-z, 0-9, and +, -, @, _ (hyphen)

☐ Provide user access to the AWS Management Console - optional
If you're providing console access to a person, it's a best practice to manage their access in IAM Identity Center.

Info If you are creating programmatic access through access keys or service-specific credentials for AWS CodeCommit or Amazon Keyspaces, you can generate them after you create this IAM user. [Learn more](#)

Cancel **Next**

Dan kom je op de volgende pagina permissions klik je op attach policies directly.

Set permissions

Add user to an existing group or create a new one. Using groups is a best-practice way to manage user's permissions by job functions. [Learn more](#)

Permissions options

☐ Add user to group
Add user to an existing group, or create a new group. We recommend using groups to manage user permissions by job function.

☐ Copy permissions
Copy all group memberships, attached managed policies, and inline policies from an existing user.

☒ **Attach policies directly**
Attach a managed policy directly to a user. As a best practice, we recommend attaching policies to a group instead. Then, add the user to the appropriate group.

Permissions policies (1240) [Refresh](#) [Create policy](#)

Choose one or more policies to attach to your new user.

Search Filter by Type

☐ Policy name Type Attached entities

Daar moet je een paar permissions aanvinken

[AmazonEC2FullAccess](#)

Dan op next en dan create user dan heb je u naam bij users staan zoals dit

Users (2) [Info](#) [Refresh](#) [Delete](#) [Create user](#)

An IAM user is an identity with long-term credentials that is used to interact with AWS in an account.

Search

<input type="checkbox"/>	User name	Path	Group	Last activity	MFA	Password age	Console last sign-in	Access key ID
<input type="checkbox"/>	Jan	/	0	2 hours ago	-	-	-	Active - AKIAR
<input type="checkbox"/>	Nabil	/	0	-	-	4 hours	-	-

Klik je op je naam en je gaat naar de tabblad security credentials scroll je een beetje en ziet acces key staan klik je op create acces key

Access key best practices & alternatives [Info](#)

Avoid using long-term credentials like access keys to improve your security. Consider the following use cases and alternatives.

Use case

☒ **Command Line Interface (CLI)**

You plan to use this access key to enable the AWS CLI to access your AWS account.

☐ **Local code**

You plan to use this access key to enable application code in a local development environment to access your AWS account.

☐ **Application running on an AWS compute service**

You plan to use this access key to enable application code running on an AWS compute service like Amazon EC2, Amazon ECS, or AWS Lambda to access your AWS account.

☐ **Third-party service**

You plan to use this access key to enable access for a third-party application or service that monitors or manages your AWS resources.

☐ **Application running outside AWS**

You plan to use this access key to authenticate workloads running in your data center or other infrastructure outside of AWS that needs to access your AWS resources.

☐ **Other**

Your use case is not listed here.



Alternatives recommended

- Use [AWS CloudShell](#), a browser-based CLI, to run commands. [Learn more](#)

Hier klik je op **Command Line Interface (CLI)**

Eens dit gedaan klik je op create acces key dan bewaart je deze acces key

Retrieve access keys [Info](#)

Access key

If you lose or forget your secret access key, you cannot retrieve it. Instead, create a new access key and make the old key inactive.

Access key

AKIARQBNDUCUQ7BZORNX

Secret access key

zGrERgqOlFmZdbbJUKdZYwtodbNA3YTPN0V4lODb [Hide](#)

Copypaste beide key ergens. (bv. Notepad)

Dan is het deel van users gedaan en dan maak je een nieuwe folder genaamd bv:

C:\Users\us\Desktop\terraform-demo dit kan op **cmd** of op windows verkenner dit folder opent je op Visual Studio Code en aan de linker zijde maak je een file aan genaamd **main.tf**. Daarna begin je je basis infrastructuur bouwen voor EC2 Instance.

```

provider "aws" {
  region = (de regio waarin je ben)
}
resource "aws_instance" "AWS_rnummer_naam" {
  ami =
  instance_type =
  tags = {
    Name = "AWS_rnummer_naam" #naam voor de instance
  }
}
output "instance_ip" {
  value = aws_instance.AWS_rnummer.public_ip
}

```

eens dit gedaan ga na terug naar AWS maar deze keer zoek je naar **ec2**

The screenshot shows the AWS Management Console interface. On the left is a navigation menu with categories like EC2 Dashboard, Instances, Elastic Block Store, Network & Security, and Load Balancing. The main content area is titled 'Resources' and shows a summary of EC2 resources in the Europe (Frankfurt) Region. A red box highlights the 'Instances (running)' count of 2. Below this, there's a 'Launch instance' section with a 'Launch instance' button and a 'Migrate a server' button. To the right of the 'Launch instance' section is the 'Service health' section, which shows the status of the EC2 service as 'OK'. Further right is the 'Zones' section, which lists available zones and their IDs. On the far right, there are sections for 'EC2 Free Tier', 'Account attributes', and 'Explore AWS'.

Klik je op Launch Instance boven recht zie je u regio staan dit moet dezelfde zijn als bij je VS Code zijn. Eens dit gedaan scroll je beneden en klik de operating system die je wilt gebruiken onder de operating system zie je AMI ID staan voorbeeld code:(ami-0084a47cc718c111a)

▼ Application and OS Images (Amazon Machine Image) [Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Q Search our full catalog including 1000s of application and OS images

Recents Quick Start

Amazon Linux macOS Ubuntu Windows Red Hat SUSE Linux

Amazon Machine Image (AMI)

Ubuntu Server 24.04 LTS (HVM), SSD Volume Type Free tier eligible

ami-0084a47cc718c111a (64-bit (x86)) / ami-099a546c02844706e (64-bit (Arm))

Virtualization: hvm ENA enabled: true Root device type: ebs

Description

Ubuntu Server 24.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).

Architecture 64-bit (x86)

AMI ID ami-0084a47cc718c111a

Username ubuntu Verified provider

Die code moet je kopiëren en plakken op vsc waar ami staat

```
ami = "ami-0084a47cc718c111a" # Dit is een Amazon Linux 2 AMI
instance_type = "t2.micro"
```

Daarnaast verander je de Regio zoals in de AWS:

```
region = "eu-central-1"
```

```
Name = "TerraformDemoInstance"
```

Dan ga je terug naar terminal en typ je de volgende command

Nu open je terminal binnen VS Code, voer je de commando's aan.

1. terraform init
2. terraform plan
3. terraform apply
4. value: yes

Als je op een error komt check nog is als je awscli en Terraform goed gedownload is of sluit VS Code is toe en terug aan soms zijn er wat bugs

Foutafhandeling:

```
Error: No valid credential sources found

with provider["registry.terraform.io/hashicorp/aws"],
on main.tf line 1, in provider "aws":
1: provider "aws" {}

Please see https://registry.terraform.io/providers/hashicorp/aws
for more information about providing credentials.

Error: failed to refresh cached credentials, no EC2 IMDS role found, operation error ec2imds: GetMetadata, exceeded maximum number of attempts, 3, request send failed, Get
"http://169.254.169.254/latest/meta-data/iam/security-credentials/": dial tcp 169.254.169.254:80: connect: A socket operation was attempted to an unreachable network.
```

aws configure

dan geeft hij u dat terug:

AWS Access Key ID: daar zet je de acces code die je had gekregen (zie hier beneden)

AWS Secret Access Key: daar zet je de Secret Access Key code die je had gekregen (zie hier beneden)

Default region name: eu-central-1

Default output format: json(dit is optioneel dit kan ook op text formaat of andere maar meest gebruikte is json.

Retrieve access keys [Info](#)

Access key

If you lose or forget your secret access key, you cannot retrieve it. Instead, create a new access key and make the old key inactive.

Access key



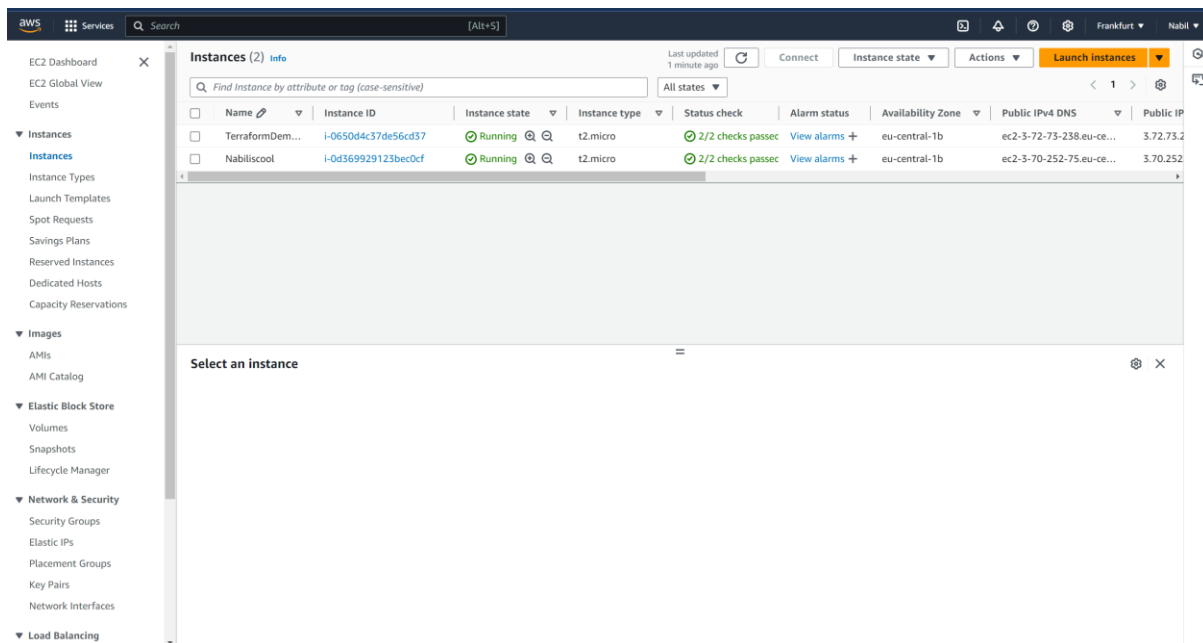
AKIARHQBNDCUQ7BZORNX

Secret access key



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 [Hide](#)

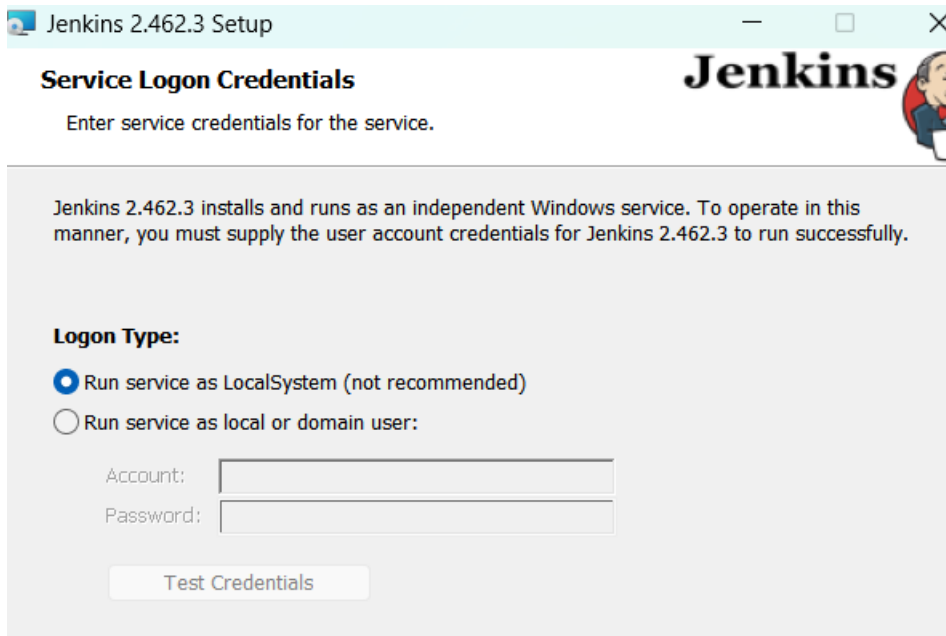
Als alles smooth runt zal je de volgende resultaat moeten krijgen bij instances:



	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IP
<input type="checkbox"/>	TerraformDem...	i-0650d4c37de56cd37	Running	t2.micro	2/2 checks passed	View alarms +	eu-central-1b	ec2-3-72-73-238.eu-ce...	3.72.73.2
<input type="checkbox"/>	Nabiliscoll	i-0d369929123bec0cf	Running	t2.micro	2/2 checks passed	View alarms +	eu-central-1b	ec2-3-70-252-75.eu-ce...	3.70.252

Hier moet dan jouw “AWS_rnummer_naam” komen

Jenkins



Jenkins 2.462.3 Setup

Service Logon Credentials

Enter service credentials for the service.

Jenkins 2.462.3 installs and runs as an independent Windows service. To operate in this manner, you must supply the user account credentials for Jenkins 2.462.3 to run successfully.

Logon Type:

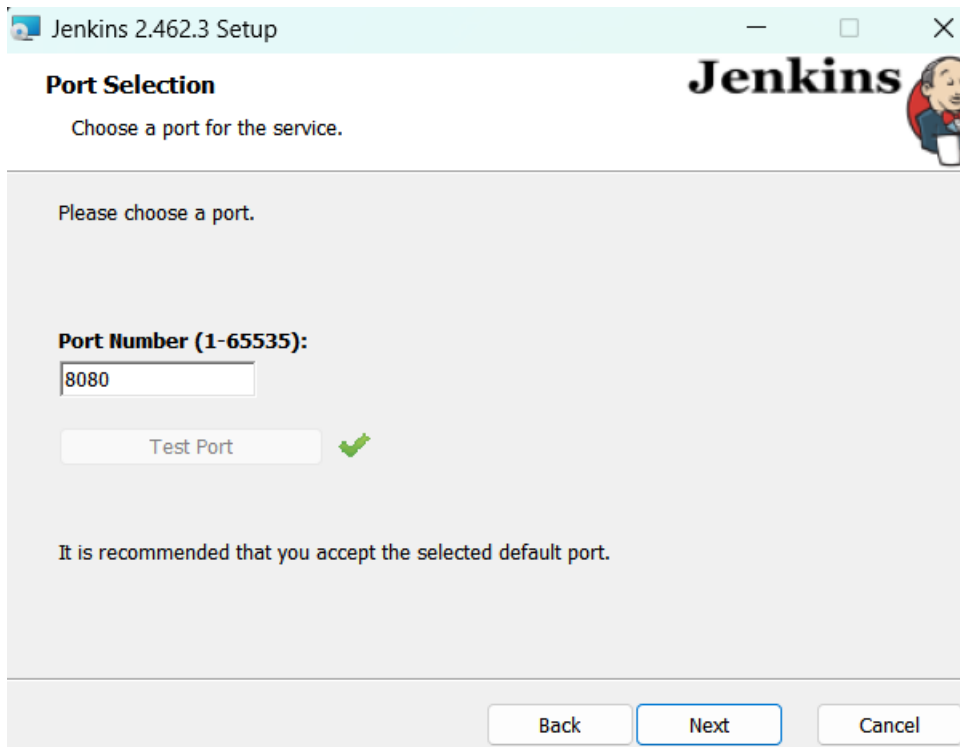
☒ Run service as LocalSystem (not recommended)

☐ Run service as local or domain user:

Account:

Password:

Test Credentials



Java 21 downloaden als je niet heb (makkelijkste x64 MSI Installer):
<https://www.oracle.com/be/java/technologies/downloads/#jdk21-windows>

Ga naar <https://localhost:8080/>

Dan zal je hier terechtkomen

Getting Started

Unlock Jenkins




To ensure Jenkins is securely set up by the administrator, a password has been written to the log ([not sure where to find it?](#)) and this file on the server:

`C:\ProgramData\Jenkins\.jenkins\secrets\initialAdminPassword`

Please copy the password from either location and paste it below.

Administrator password

Copypaste de PATH: C:\ProgramData\Jenkins\.jenkins\secrets\ op file folder en dan moet je hier beland zijn

<input type="checkbox"/> Name	Date modified	Type	Size
 initialAdminPassword	12/10/2024 14:29	File	1 KB
 jenkins.model.Jenkins.crumbSalt	12/10/2024 14:29	CRUMBSALT File	1 KB
 master.key	12/10/2024 14:29	KEY File	1 KB

Open de file op notepad en copypaste de wachtwoord op de browser

Kies voor suggested

Customize Jenkins

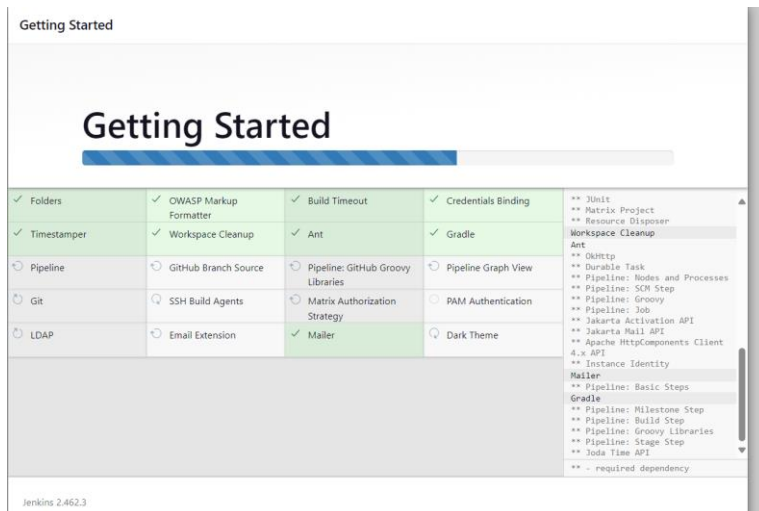
Plugins extend Jenkins with additional features to support many different needs.

Install suggested plugins

Install plugins the Jenkins community finds most useful.

Select plugins to install

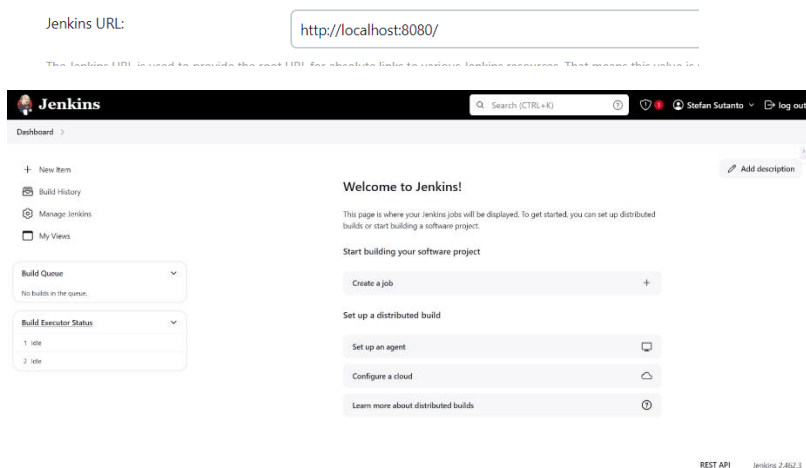
Select and install plugins most suitable for your needs.



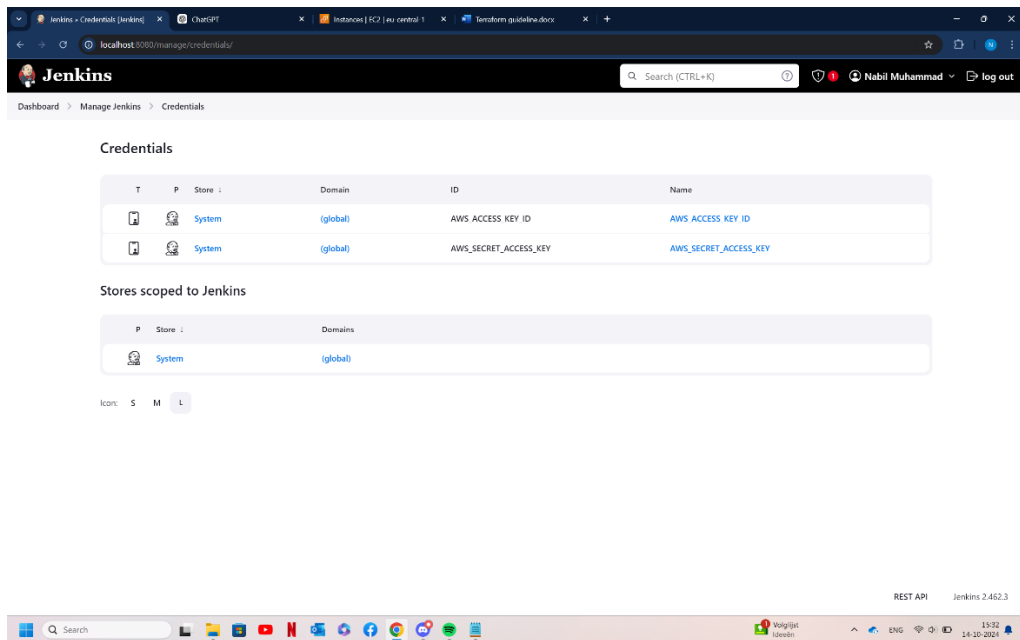
Hier maak je een admin account en dan klik op save & continue

Hier default URL is goed

Instance Configuration

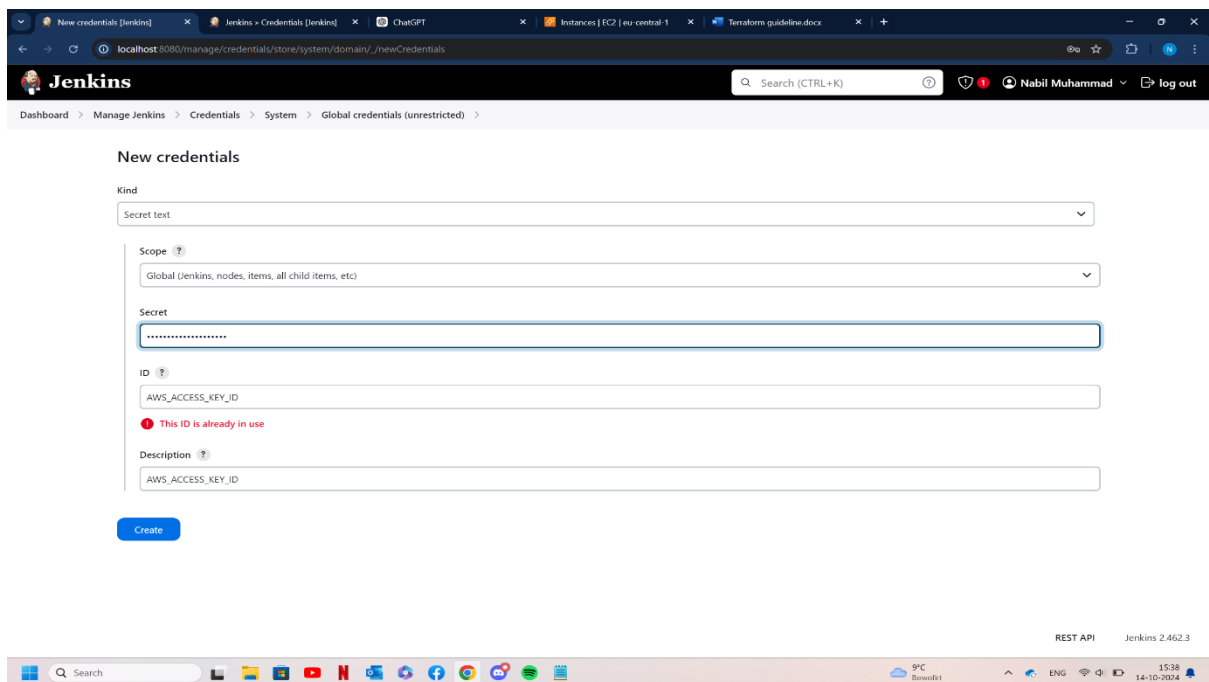


Eens dit is gedaan klik je op manage jenkins>credentials



Klik je op global bij (Stores scoped to Jenkins) en add credentials dan krijg je deze pagina volg zet exact dezelfde ding dat op de afbeelding staat(vergeet niet bij secret zet je u acces key en secret key (zie hier beneden):

Dit is acces key (AWS_ACCESS_KEY_ID):



Dit is secret key (AWS_SECRET_ACCESS_KEY):

New credentials

Kind: Secret text

Scope: Global (Jenkins, nodes, items, all child items, etc)

Secret: [masked]

ID: AWS_SECRET_ACCESS_KEY
This ID is already in use

Description: AWS_SECRET_ACCESS_KEY

Create

Dit is de code die je bij secret moet zetten dit moest je opslaan als je dit niet meer hebt moet je terug naar boven waar je een user moet aanmaken op IAM.

Retrieve access keys [Info](#)

Access key

If you lose or forget your secret access key, you cannot retrieve it. Instead, create a new access key and make the old key inactive.

Access key

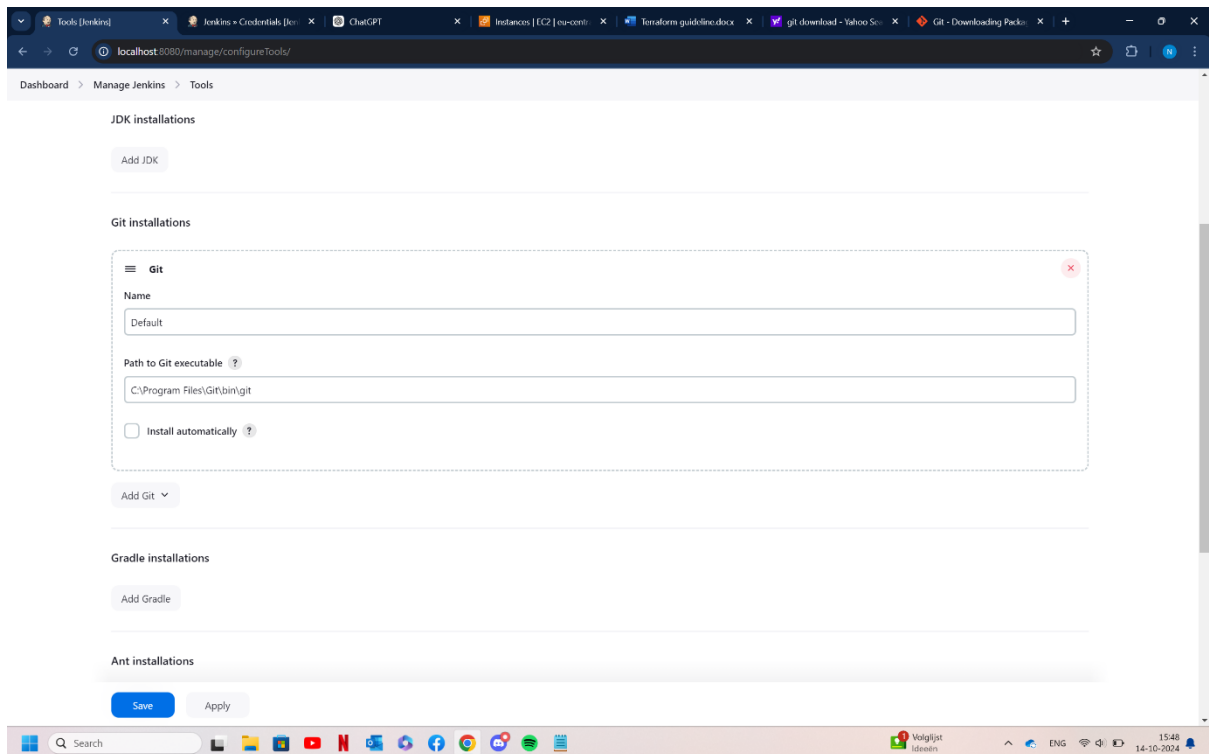
AKIARHQBNDCUQ7BZORNX

Secret access key

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 [Hide](#)

Dan druk je op save en ga je naar tools ook in configure jenkins>tools daar doe je de volgende:

Zet u git path binnen de git installations(als je geen git hebt zie boven)



Maak een nieuwe pipeline bij dashboard op new item en geef een naam en op pipeline drukken



Hier schrijf je de script

Pipeline

Definition

Pipeline script

Script ?

1

try sample Pipeline... ▼

☒ Use Groovy Sandbox ?

Hierbij de code voor de pipeline script :

```
pipeline {
  agent any
  stages {
    stage('Prepare') {
      steps {
        writeFile file: 'main.tf', text: ""
        variable "aws_access_key" {
          description = "AWS Access Key"
          type        = string
        }

        variable "aws_secret_key" {
          description = "AWS Secret Key"
          type        = string
        }

        provider "aws" {
          region    = "eu-central-1"
          access_key = var.aws_access_key
          secret_key = var.aws_secret_key
        }

        resource "aws_instance" "JEN_rnummer_naam" {
          ami          = "" // Vervang dit door een geldige AMI in eu-central-1
          instance_type = "t2.micro"

          tags = {
```

```

        Name = "" // Geef hier een naam op voor je instantie
    }
}
"""

}
}

stage('Init') {
    steps {

        bat "'C:\\Program Files\\Terraform\\terraform.exe' init'
    }
}

stage('Plan') {
    steps {

        bat """
        "C:\\Program Files\\Terraform\\terraform.exe" plan \
        -var aws_access_key="AKIARHQBNDUCUVMHZICFC" \
        -var aws_secret_key="F2U9QKsinXIHlv/M+OLoKG5711r3w2ey9LJS+epO "
        """
    }
}

stage('Apply') {
    steps {

        bat """
        "C:\\Program Files\\Terraform\\terraform.exe" apply -auto-approve \
        -var aws_access_key=" AKIARHQBNDUCUVMHZICFC " \
        -var aws_secret_key="F2U9QKsinXIHlv/M+OLoKG5711r3w2ey9LJS+epO "
        """
    }
}
}
}
}

```

Er moet een paar dingens aangepast worden binnen deze code de

```

-var aws_access_key="AKIARHQBNDUCUVMHZICFC" \
-var aws_secret_key="F2U9QKsinXIHlv/M+OLoKG5711r3w2ey9LJS+epO "
secret code zijn

```

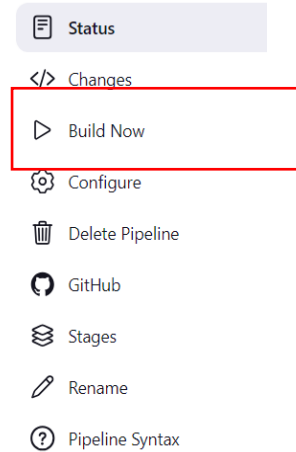
```

ami      = "ami-0084a47cc718c111a" // Vervang dit door een geldige AMI in Frankfurt
een andere hebt gebruikt dan ubuntu vervang de ami met de jouwe

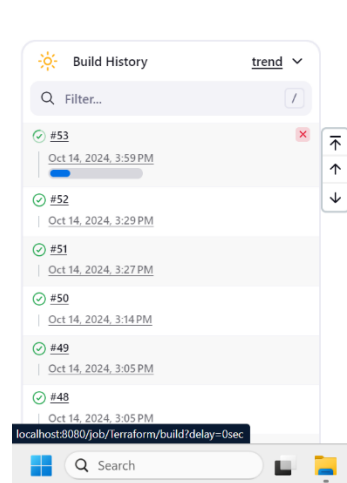
```

Name = "" // Geef hier een naam op voor je instantie **hier moet je JEN_rnummer_naam plaatsen**

Eens geplakt klik je op Save en dan zie je links build now staan klik erop en wacht :



Tot dat dit laat



Eens geladen ga je naar <https://eu-central-1.console.aws.amazon.com/ec2/home?region=eu-central-1#Instances>: en daar zal je u instance zien staan

Instances (1/5) <small>Info</small>										
Find Instance by attribute or tag (case-sensitive)				All states						
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public	
<input type="checkbox"/>	MijnEC2Instance	i-01246c23e7d9f9355	Running	t2.micro	2/2 checks passed	View alarms +	eu-central-1b	ec2-3-66-157-155.eu-c...	3.66.1	
<input type="checkbox"/>	TerraformDem...	i-0650d4c37de56cd37	Running	t2.micro	2/2 checks passed	View alarms +	eu-central-1b	ec2-3-72-73-238.eu-ce...	3.72.7	
<input type="checkbox"/>	Nabiliscool	i-0d369929123bec0cf	Running	t2.micro	2/2 checks passed	View alarms +	eu-central-1b	ec2-3-70-252-75.eu-ce...	3.70.2	
<input checked="" type="checkbox"/>	NabilMuhamm...	i-0a9610d36e367d4da	Running	t2.micro	2/2 checks passed	View alarms +	eu-central-1b	ec2-52-59-201-65.eu-c...	52.59.	
<input type="checkbox"/>	MijnEC2Instance	i-0816658f89f7e699c	Running	t2.micro	2/2 checks passed	View alarms +	eu-central-1b	ec2-54-93-89-54.eu-ce...	54.93.	

Resultaat

Dit is de resultaat die jullie moeten doorsturen via github: naam repository:

Terraform_rnummer_naam

Screenshot van de EC2 Instances, **copypaste** de file (.tf, .hcl, tf.state. en tf.state.backup), screenshot van Jenkins Output) en delen via email

File Edit View Repository Branch Help

Current repository

Voorbeeld-Bewijs-Terraform-L...

Current branch

main

Fetch origin

Never fetched

Changes 6

History

console output Jenkins.txt

6 changed files

.terraform.lock.hcl

console output Jenkins.txt

main.tf

Screenshot_14-...amazon.com.jpeg

terraform.tfstate

terraform.tfstate.backup

1 + Started by user Stefan Sutanto

2 +

3 + [Pipeline] Start of Pipeline

4 + [Pipeline] node

5 + Running on Jenkins

6 + in C:\ProgramData\Jenkins\.jenkins\workspace\Test1

7 + [Pipeline] {

8 + [Pipeline] stage

9 + [Pipeline] { (Prepare)

10 + [Pipeline] writeFile

.terraform.lock.hcl

Console Output Jenkins.jpeg

Screenshot_14-10-...s.amazon.com.jpeg

main.tf

terraform.tfstate

terraform.tfstate.backup

Vb screenshot Jenkins output:

✓

Console Output

Started by user Stefan Sutanto

[Pipeline] Start of Pipeline

[Pipeline] node

Running on Jenkins in C:\ProgramData\Jenkins\.jenkins\workspace\Test1

[Pipeline] {

[Pipeline] stage

[Pipeline] { (Prepare)

[Pipeline] writeFile

Vb screenshot Instance:

Instances (1/4) [info](#)

Last updated 34 minutes ago

Co

Instance state = running X

Clear filters

	Name	Instance ID	Instance state	Instance type
<input checked="" type="checkbox"/>	TestTerraJenkins	i-Of400cc70b89e39e1	Running	t2.micro
<input type="checkbox"/>	TestMetJenkins	i-0735c86131d418e04	Running	t2.micro
<input type="checkbox"/>	JEN_r0891534	i-08592a04880f09073	Running	t2.micro
<input type="checkbox"/>	AWS_r089153...	i-0aecc8364dd042605	Running	t2.micro