

פרויקט DevOps

מגישים

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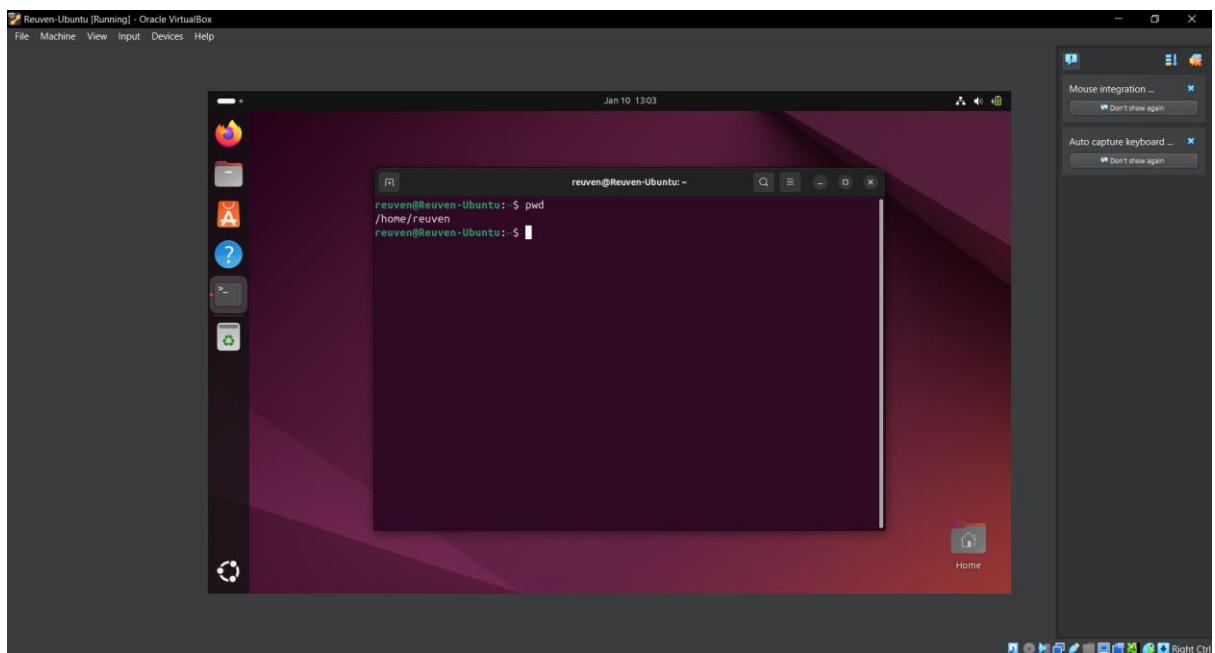
קישור לgitHub: <https://github.com/reuven-itzhakov/DevOps-Project>

הרצאה 1

הורדנו Ubuntu Image של Ubuntu והגדכנו אותו ב-VirtualBox.

ביצענו התקינה והפעילנו את המכונה הווירטואלית.

פתחנו טרמינל והקלדנו את הפקודה `pwd`:



המערכת הציגה את נתיב התקייה הנוכחי.

הרצאה 2

פתחנו את הטרמינל בתוך מכונת ה-Ubuntu.

הקלדנו את הפקודה `pwd`:

```
reuven@Reuven-Ubuntu:~$ pwd  
/home/reuven
```

what is your username? reuven

what is your machine name? Reuven-Ubuntu

what is your current directory? /home/Reuven

יצרנו קובץ `test.file` באמצעות `touch`, ולאחר מכן השתמשנו בו על מנת לבדוק שאכן נוצר. לאחר מכן רשםנו לקובץ שיצרנו את הטקסט "Hello World!" באמצעות `echo`, וזה הדפסנו את התוכנה של הקובץ באמצעות הפקודה `cat`:

```
reuven@Reuven-Ubuntu:~$ touch test.file  
reuven@Reuven-Ubuntu:~$ ls  
Desktop Downloads my_test_project Pictures snap test.file  
Documents Music personal Public Templates Videos  
reuven@Reuven-Ubuntu:~$ echo "Hello World!" > test.file  
reuven@Reuven-Ubuntu:~$ cat test.file  
Hello World!
```

הרצאה 3

1. תשתמשו ב-`git` לפעולות השונות

יצרנו repo (הרייפוסיטורי) שנמצא בדף הראשון של מסמך זה – Devops Project – יצרנו קובץ וויספנו אותו באמצעות `git add`, ערכנו אותו וביצענו `commit`, לאחר מכן מחקנו אותו, ביצענו `commit` שוב, ולבסוף `push`:

```
Reuven@DESKTOP-PPBCLCJ MINGW64 ~/Desktop/ספואבד/DevOps Project (main)
$ touch text.txt

Reuven@DESKTOP-PPBCLCJ MINGW64 ~/Desktop/ספואבד/DevOps Project (main)
$ git add text.txt

Reuven@DESKTOP-PPBCLCJ MINGW64 ~/Desktop/ספואבד/DevOps Project (main)
$ git commit -m "Created file text.txt"
[main 372f9cf] Created file text.txt
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 text.txt

Reuven@DESKTOP-PPBCLCJ MINGW64 ~/Desktop/ספואבד/DevOps Project (main)
$ git status
On branch main
Your branch is ahead of 'origin/main' by 1 commit.
  (use "git push" to publish your local commits)

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
    modified:   text.txt

no changes added to commit (use "git add" and/or "git commit -a")

Reuven@DESKTOP-PPBCLCJ MINGW64 ~/Desktop/ספואבד/DevOps Project (main)
$ git add text.txt

Reuven@DESKTOP-PPBCLCJ MINGW64 ~/Desktop/ספואבד/DevOps Project (main)
$ git commit -m "Edited file text.txt"
[main acbcae5] Edited file text.txt
 1 file changed, 1 insertion(+)

Reuven@DESKTOP-PPBCLCJ MINGW64 ~/Desktop/ספואבד/DevOps Project (main)
$ git rm text.txt
rm 'text.txt'

Reuven@DESKTOP-PPBCLCJ MINGW64 ~/Desktop/ספואבד/DevOps Project (main)
$ git commit -m "Deleted file text.txt"
[main c0d9c90] Deleted file text.txt
 1 file changed, 1 deletion(-)
 delete mode 100644 text.txt

Reuven@DESKTOP-PPBCLCJ MINGW64 ~/Desktop/ספואבד/DevOps Project (main)
$ git push
Enumerating objects: 8, done.
Counting objects: 100% (8/8), done.
Delta compression using up to 8 threads
Compressing objects: 100% (5/5), done.
Writing objects: 100% (7/7), 731 bytes | 731.00 KiB/s, done.
Total 7 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/reuven-itzhakov/DevOps-Project.git
  6f7a039..c0d9c90  main -> main
```

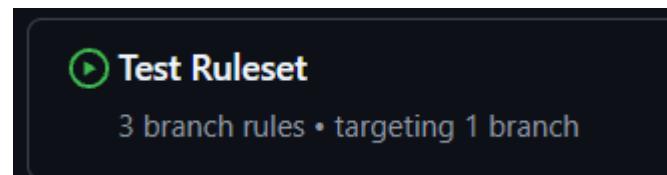
2. הוסיפו חבר צוות -Ruleset

הוסףנו חבר צוות -Collaborators במאגר:

The screenshot shows the 'Collaborators and teams' section of a GitHub repository settings page. On the left sidebar, 'Collaborators' is selected under 'Access'. In the main area, there's a 'Public repository' section stating 'This repository is public and visible to anyone' with a 'Manage visibility' button. Below it, a 'Direct access' box shows '1 entity has access to this repository. 0 collaborators. 1 invitation.' A red circle highlights the 'Add people' button in the 'Manage access' section. Underneath, a search bar says 'Find a collaborator...' and a list shows 'Shalev Cohen' with the status 'Awaiting shalews's response'. There are also 'Pending Invite' and 'Remove' buttons.

הגדנו "Branch protection rules" כך שלא ניתן לדחוף קוד ישירות ל-**Master**.
הגדנו חובה לפתח PR עבור כל שינוי, עם דרישת אישור של שני חברים צוות לפחות לפני המיזוג.

The screenshot shows the 'Branch protection rules' settings. It includes sections for 'Require a pull request before merging' (checked), 'Required approvals' (set to 2), and 'Dismiss stale pull request approvals when new commits are pushed' (checked). The text below the approvals dropdown states 'The number of approving reviews that are required before a pull request can be merged.'



3. מה זה Dependabot?

Dependabot זה כלי אוטומטי של GitHub שטורק את הסprüיות והתלוויות בפרויקט. צריך אותו כדי לאלהות פרצות אבטחה או גרסאות מישנות של קוד חיוני שאנו משתמשים בו. הוא פועל ברקע באופן קבוע ושולח התראות או פותח Pull Requests אוטומטיים לעדכון גרסאות. הוא חוסף זמן בתחזקה ומונע פריצות לאתר/אפליקציה קבוצה שנובעות מחורי אבטחה בסprüיות צד-שלישי.

הרצאה 4

יצרנו את הסקrypt הבא ושמרנו אותו כ-**sh**

```
#!/bin/bash

# 1. Define variables
SOURCE_DIR=~/personal
# Create a timestamp in format: YYYYMMDDHHMMSS
TIMESTAMP=$(date +%Y%m%d%H%M%S)
DEST_DIR=~/backup_archive_.$TIMESTAMP

# Check if the source directory exists before starting
if [ ! -d "$SOURCE_DIR" ]; then
    echo "Error: Source directory $SOURCE_DIR does not exist."
    exit 1
fi

# 2. Perform backup (recursive copy)
echo "Copying $SOURCE_DIR to $DEST_DIR..."
cp -r "$SOURCE_DIR" "$DEST_DIR"

# 3. Rotation: keep only the 3 most recent backups
# Explanation of the command:
# ls -dt: lists all directories matching backup_archive_* sorted by time (newest first)
# tail -n +4: skips the first 3 lines (the newest backups) and passes the rest (older ones)
# xargs -r rm -rf: takes the list of old backups and removes them (-r avoids errors if the list is empty)

ls -dt ~/backup_archive_* | tail -n +4 | xargs -r rm -rf

# 4. Show final result (as in the image you sent)
echo "Done. Current backups list:"
ls -ld ~/backup_archive_*
```

הסבר על הפקודות החשובות

(**20241118055424**): הפקודה זו מייצרת את המחרוזת (למשל **date +%Y%m%d%H%M%S**) שדרישה לשם התקינה.

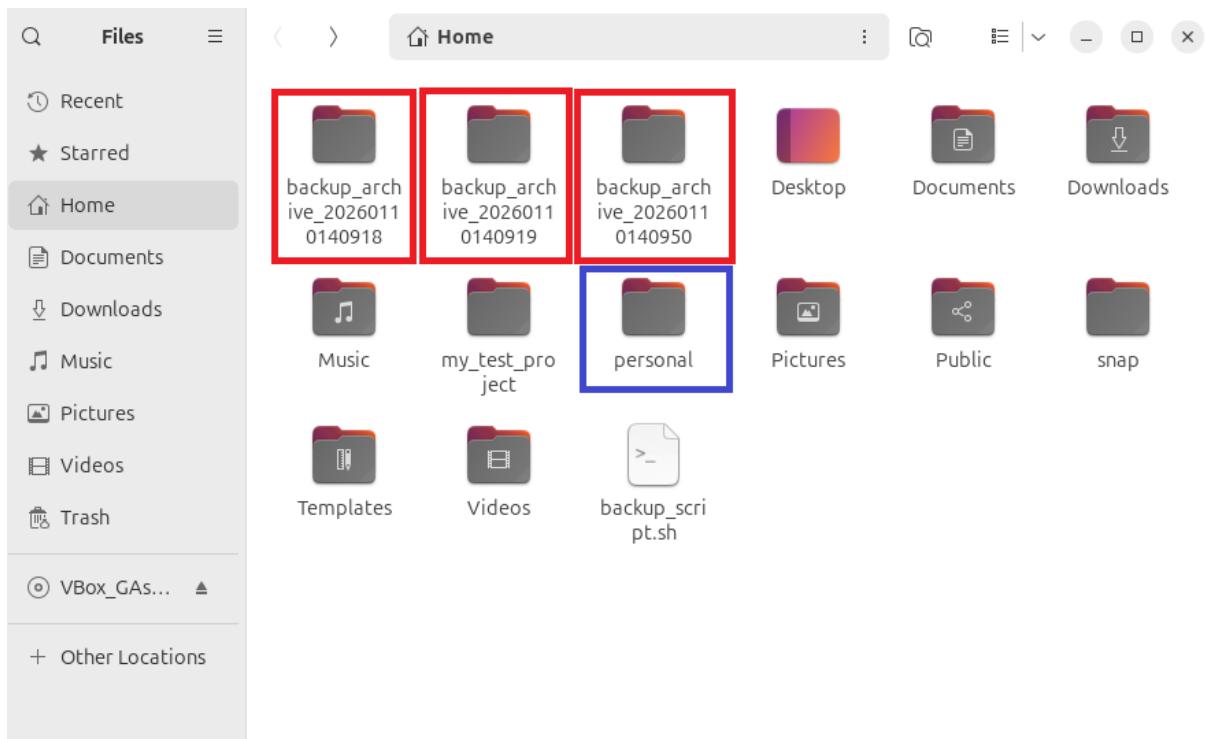
-r cp: מעתק תקין על כל תוכולתה (recursive).

ls -dt ... | tail -n +4 | xargs -r rm -rf: זהו "Pipeline" שמנהן את המחקה: אנחנו מבקשים מהמערכת: "תן לי את רשימת הגיבויים מסודרים מחדש לישן". "תתעלם מ-3 הראשונים (הcy Chashim)". "את כל מה שנשאר (הישנים) – תמחק".

לאחר הרצת הסקrypt נקבל את הפלט הבא:

```
reuven@Reuven-Ubuntu:~$ ./backup_script.sh
Copying /home/reuven/personal to /home/reuven/backup_archive_20260110140950...
Done. Current backups list:
drwxrwxr-x 2 reuven reuven 4096 Jan 10 14:09 /home/reuven/backup_archive_20260110140918
drwxrwxr-x 2 reuven reuven 4096 Jan 10 14:09 /home/reuven/backup_archive_20260110140919
drwxrwxr-x 2 reuven reuven 4096 Jan 10 14:09 /home/reuven/backup_archive_20260110140950
```

ואת הקבצים הבאים אשר מכילים את תוכנת תקין **personal**:



הערה: לאחר כל הריצה של הסקריפט נתקבל תיקייה חדשה עם תאריך מתאים ותוכולה מותאמת לתוכלה של תיקיית personal, במידה ויש יותר מ-3 תיקיות, התיקייה החדשה ביותר תמחק ותוחלף באחת עדכנית.

הרצאה 5

פתחנו את האתר, ייצרנו Instance, וכתבנו את הפקודה:

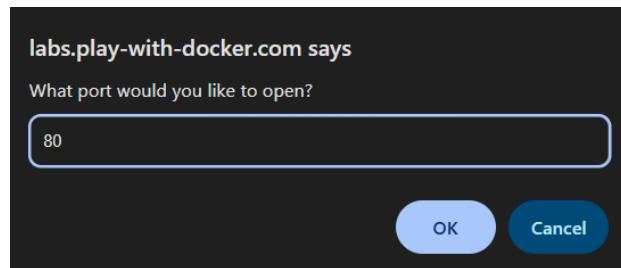
The screenshot shows the Docker instance interface. On the left, there's a sidebar with a clock showing 01:58:42, a 'CLOSE SESSION' button, an 'Instances' section listing 'node1' at IP 192.168.0.19, and a 'GIVE FEEDBACK' button. The main area has tabs for 'IP' (192.168.0.19), 'OPEN PORT', 'Memory', and 'CPU'. A terminal window is open with the following command history and output:

```

WARNING!!!!
# This is a sandbox environment. Using personal credentials
# is HIGHLY! discouraged. Any consequences of doing so are
# completely the user's responsibilites.
#
# The PWD team.
#####
[node1] (local) root@192.168.0.19 ~
$ docker run -dp 80:80 docker/getting-started:pwd
Unable to find image 'docker/getting-started:pwd' locally
pwd: Pulling from docker/getting-started
89d9c30c1d49: Pull complete
24f1cf02bf4: Pull complete
16542569a10d: Pull complete
03396939143d: Pull complete
Digest: sha256:9156cd395e7e41490d534ae95513d1fc7929db720393448306c5d7263d7f2696
status: Downloaded newer image for docker/getting-started:pwd
09af9c97fddab28d742b602f74b686d2e64a9a9ee939cb52ebcaa8283275651
(node1) (local) root@192.168.0.19 ~
$ 

```

פתחנו פורט 80

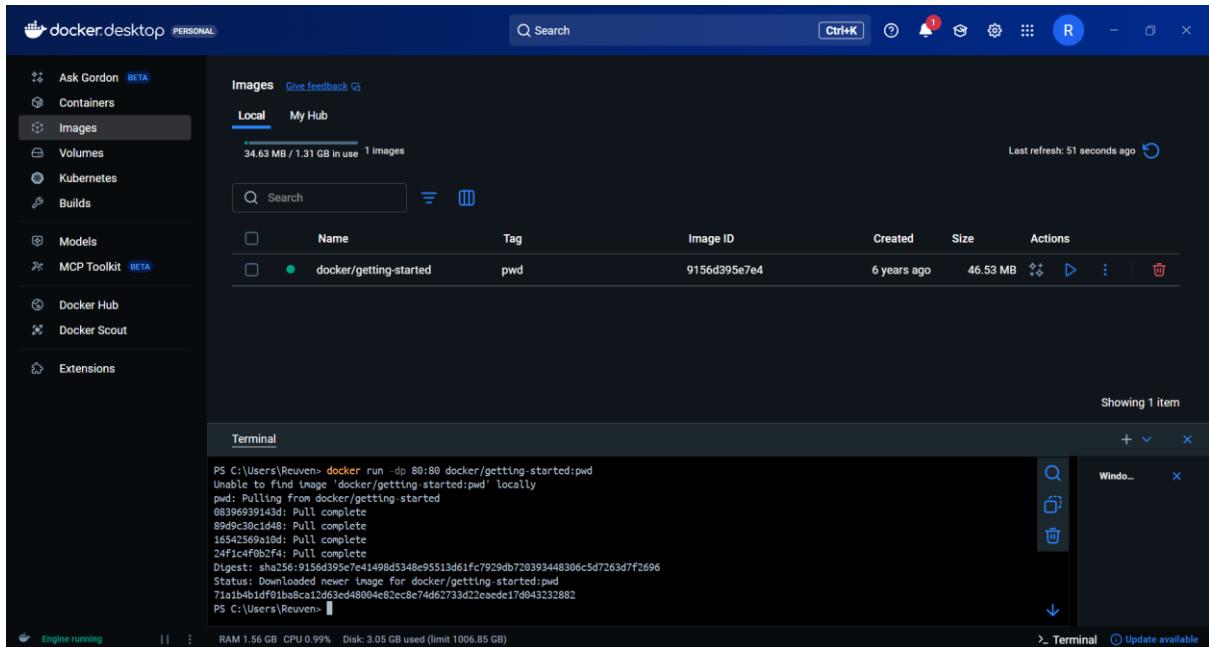


הגענו לאתר הבא:

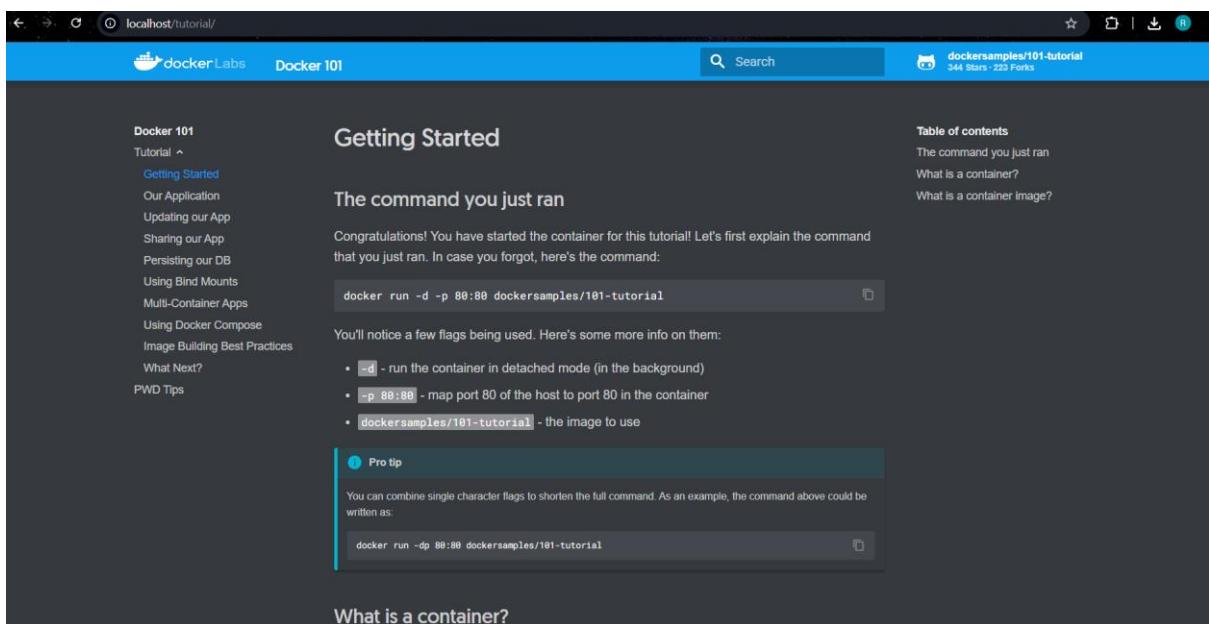
<http://ip172-18-0-28-d5h69v291nsg00essaig-80.direct.labs.play-with-docker.com/tutorial>

The browser window shows the Docker 101 tutorial page. The URL is 'ip172-18-0-28-d5h69v291nsg00essaig-80.direct.labs.play-with-docker.com/tutorial/'. The page has a navigation bar with 'Docker Labs' and 'Docker 101'. The main content area is titled 'Getting Started' and contains a section 'The command you just ran' with the command 'docker run -d -p 80:80 dockersamples/101-tutorial'. It also includes a 'Table of contents' sidebar with links to 'The command you just ran', 'What is a container?', and 'What is a container image?'. A 'Pro tip' box at the bottom left suggests combining flags: 'You can combine single character flags to shorten the full command. As an example, the command above could be written as:' followed by the command 'docker run -dp 80:80 dockersamples/101-tutorial'.

פתחנו לוקליות, ורשמנו שם את הפקודה:



פתחנו את <http://localhost>



```
# app.py  
print("Hello, Docker!")
```

יצרנו קובץ `app.py`:

יצרנו קובץ Dockerfile

```
# Use python:3.10-slim as the base image
FROM python:3.10-slim

# (Optional but recommended) Set working directory inside the container
WORKDIR /app

# Copy app.py into the container (to the /app directory)
COPY app.py .

# Set the command to run python app.py by default
CMD ["python", "app.py"]
```

נשתמש בפקודה:

```
docker build -t hello-docker .
```

```
C:\Users\Reuven\Desktop\DEVOPS\DevOps Project>docker build -t hello-docker .
[+] Building 10.3s (9/9) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 345B
=> [internal] load metadata for docker.io/library/python:3.10-slim
=> [auth] library/python:pull token for registry-1.docker.io
=> [internal] load .dockerrcignore
=> => transferring context: 2B
=> [1/3] FROM docker.io/library/python:3.10-slim@sha256:7b68a5fa7cf0d20b4cedb1dc9a134fdd394fe27edbc4c2519756c91d 3.9s
=> => resolve docker.io/library/python:3.10-slim@sha256:7b68a5fa7cf0d20b4cedb1dc9a134fdd394fe27edbc4c2519756c91d 0.1s
=> => sha256:8715e552fa1374bbde269437d9a1c607c817289c2ebbccb9ed9ab1aa9ca86763 1.29MB / 1.29MB 0.5s
=> => sha256:7da4424a113245eb185ea22f2512eceb36f80ca1d0547c64b117f28495d3c3e5 250B / 250B 0.5s
=> => sha256:9c27bc7ba63d1ac690daefc68302197d3ab9a91fc5c0e19f447cd57eda92d87c 13.82MB / 13.82MB 1.3s
=> => sha256:02d7611c4eae219af91448a4720bdb0a036575d3bc0356fce12774af85daa6aff 29.78MB / 29.78MB 2.2s
=> => extracting sha256:02d7611c4eae219af91448a4720bdb0a036575d3bc0356fce12774af85daa6aff 0.7s
=> => extracting sha256:8715e552fa1374bbde269437d9a1c607c817289c2ebbccb9ed9ab1aa9ca86763 0.1s
=> => extracting sha256:9c27bc7ba63d1ac690daefc68302197d3ab9a91fc5c0e19f447cd57eda92d87c 0.5s
=> => extracting sha256:7da4424a113245eb185ea22f2512eceb36f80ca1d0547c64b117f28495d3c3e5 0.0s
=> [internal] load build context
=> => transferring context: 66B 0.2s
=> [2/3] WORKDIR /app 2.5s
=> [3/3] COPY app.py . 0.1s
=> exporting to image 0.8s
=> => exporting layers 0.4s
=> => exporting manifest sha256:0fd198b833ea584d46dc60f5794fd92248d83b9cfdeb3dd83d69d356eca0ec74 0.0s
=> => exporting config sha256:0b6a04bc25e42294d473808fcff45fa628a0b53e92dc771ace3e76782833191 0.0s
=> => exporting attestation manifest sha256:8001306f2d7ec2b54281391e0f7a1c441fc13ac03ed1aed8f47303faaaaf7aec 0.1s
=> => exporting manifest list sha256:19a0f63c9ea3cc870f946fccab5b6aee66a83f7dba739094e6ae2cb7a0fdc974a 0.0s
=> => naming to docker.io/library/hello-docker:latest 0.0s
=> => unpacking to docker.io/library/hello-docker:latest 0.1s
```

`:docker run hello-docker` נרץ באמצעות

```
C:\Users\Reuven\Desktop\DEVOPS\DevOps Project>docker run hello-docker  
Hello, Docker!
```

הרצאה 6

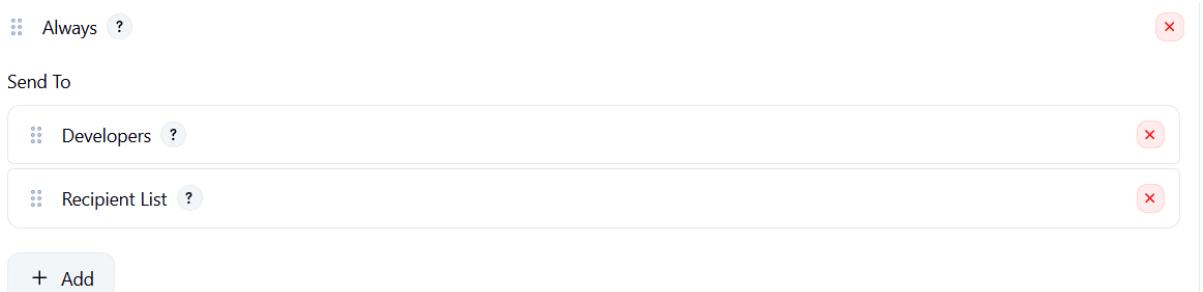
הרצינו docker של jenkins ונכנו ל-localhost 8080. שם הדףן jenkins והתקן :python

```
+ echo hello world!  
hello world!  
+ set -e  
+ python --version  
Python 3.13.5
```

ביצוע טסט לקוד:

```
+ pytest -v  
===== test session starts =====  
platform linux -- Python 3.13.5, pytest-9.0.2, pluggy-1.6.0 -- /var/jenkins_home/workspace/Shalev Jenkins/.venv/bin/python  
cachedir: .pytest_cache  
rootdir: /var/jenkins_home/workspace/Shalev Jenkins  
collecting ... collected 1 item  
  
tests/test_basic.py::test_example PASSED [100%]  
  
===== 1 passed in 0.00s =====  
Finished: SUCCESS
```

הגדרת jenkins ששלוח מייל עבור כל הרצה:



שליחת email:

```
Email was triggered for: Always  
Sending email for trigger: Always  
Sending email to: coshalev2@gmail.com  
Finished: SUCCESS
```

כתובת המשימה שטורץ: Shell code

Execute shell ?

Command

See the [list of available environment variables](#)

```
echo "hello world!"  
set -e  
  
python --version  
  
python -m venv .venv  
. .venv/bin/activate  
  
pip install --upgrade pip  
pip install -r requirements.txt  
  
pytest -v
```

דוגמא מהמצגת:

```
+ echo starting the build...  
starting the build...  
+ echo building the project...  
building the project...  
+ sleep 5  
+ echo build completed successfully!  
build completed successfully!
```

הרצאה 7

שקי甫

3 nodes :On master node

יצרנו מאסטר נוד והגדכנו אותו, בנוסף יצרנו עוד 2 workers ובירצנו להם join למאסטר.

```
[node1 ~] $ kubectl get nodes
NAME      STATUS    ROLES          AGE     VERSION
node1     Ready     control-plane   6m21s   v1.27.2
node2     Ready     <none>        4m3s    v1.27.2
node3     Ready     <none>        3m50s   v1.27.2
[node1 ~] $ kubectl get services
NAME         TYPE        CLUSTER-IP   EXTERNAL-IP   PORT(S)    AGE
kubernetes   ClusterIP  10.96.0.1   <none>        443/TCP   6m27s
[node1 ~] $ kubectl get pods
No resources found in default namespace.
```

:Minikube

התקנו docker והרצנו אותו באמצעות .docke

```
C:\Users\cosha>kubectl get nodes
NAME      STATUS    ROLES          AGE     VERSION
minikube  Ready     control-plane   12d    v1.34.0

C:\Users\cosha>minikube status
minikube
type: Control Plane
host: Running
kubelet: Running
apiserver: Running
kubeconfig: Configured

C:\Users\cosha>kubectl version
Client Version: v1.34.1
Kustomize Version: v5.7.1
Server Version: v1.34.0
```

זיהוי רשימה של כל הפודים בתחום namespaces הנ"ל ב k8s cluster

NAMESPACE	NAME	READY	STATUS	RESTARTS	AGE
default	hello-minikube-bbcb89c6c-dwzr8	1/1	Running	1 (2m31s ago)	12d
kube-system	coredns-66bc5c9577-8qkm7	1/1	Running	1 (2m31s ago)	12d
kube-system	etcd-minikube	1/1	Running	1 (2m31s ago)	12d
kube-system	kube-apiserver-minikube	1/1	Running	1 (2m31s ago)	12d
kube-system	kube-controller-manager-minikube	1/1	Running	1 (2m31s ago)	12d
kube-system	kube-proxy-r8d2p	1/1	Running	1 (2m31s ago)	12d
kube-system	kube-scheduler-minikube	1/1	Running	1 (2m31s ago)	12d
kube-system	storage-provisioner	1/1	Running	3 (103s ago)	12d
kubernetes-dashboard	dashboard-metrics-scraper-77bf4d6c4c-xkwdm	1/1	Running	1 (2m31s ago)	12d
kubernetes-dashboard	kubernetes-dashboard-855c9754f9-t9hzz	1/1	Running	2 (99s ago)	12d

:Run service

C:\Users\cosha>kubectl get services hello-minikube					
NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
hello-minikube	NodePort	10.111.227.226	<none>	8080:31635/TCP	12d

:Access Service

הרכינו dashboard ולאחר מכן ניגשנו אל ה web הנ"ל:

```
Request served by hello-minikube-bbcb89c6c-dwzr8
HTTP/1.1 GET /
Host: 127.0.0.1:51256
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Accept-Encoding: gzip, deflate, br, zstd
Accept-Language: he-IL,he;q=0.9,en-US;q=0.8,en;q=0.7
Connection: keep-alive
Sec-Ch-Ua: "Google Chrome";v="143", "Chromium";v="143", "Not A(Brand");v="24"
Sec-Ch-Ua-Mobile: ?
Sec-Ch-Ua-Platform: "Windows"
Sec-Fetch-Dest: document
Sec-Fetch-Mode: navigate
Sec-Fetch-Site: none
Sec-Fetch-User: ?
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/143.0.0.0 Safari/537.36
```

Postman

התקנו postman וירצנו פקודות get & post וניגשנו אליו באתרים הטעים מהסעיף הקודם בweb.

The screenshot shows the Postman interface for a GET request. The URL is set to `http://localhost:51256/`. The response status is `200`, and the raw response body is displayed as:

```
1 Request served by hello-minikube-bbcb89c6c-dwzr8
2
3 HTTP/1.1 GET /
4
5 Host: localhost:51256
6 Accept: */*
7 Accept-Encoding: gzip, deflate, br
8 Connection: keep-alive
9 Postman-Token:
        46ec81c3-0226-4cd6-9618-efc7a092f5da
10 User-Agent: PostmanRuntime/7.51.0
11
```

The screenshot shows the Postman interface for a POST request. The URL is set to `http://localhost:51256/`. The request body is a JSON object:

```
1 {
2   "name": "Shalev",
3   "my_new_name": "Shalev2"
4 }
```

The response status is `200`, and the raw response body is displayed as:

```
1 Request served by hello-minikube-bbcb89c6c-dwzr8
2
3 HTTP/1.1 POST /
4
5 Host: localhost:51256
6 Accept: */*
7 Accept-Encoding: gzip, deflate, br
8 Connection: keep-alive
9 Content-Length: 51
10 Content-Type: application/json
11 Postman-Token:
        9599d2ad-2c49-4e31-8555-76c3f9a1be1b
12 User-Agent: PostmanRuntime/7.51.0
13
14 {
15   "name": "Shalev",
16   "my_new_name": "Shalev2"
17 }
```

Cluster management

ניהול המילויים במאזעוט מגוון פקודות:

```
C:\Users\cosha>minikube pause
* Pausing node minikube ...
* Paused 18 containers in: kube-system, kubernetes-dashboard, storage-gluster, istio-operator

C:\Users\cosha>minikube unpause
* Unpausing node minikube ...
* Unpaused 18 containers in: kube-system, kubernetes-dashboard, storage-gluster, istio-operator

C:\Users\cosha>minikube config set memory 9001
! These changes will take effect upon a minikube delete and then a minikube start
```

```
C:\Users\cosha>minikube addons list
```

ADDON NAME	PROFILE	STATUS	MAINTAINER
ambassador	minikube	disabled	3rd party (Ambassador)
amd-gpu-device-plugin	minikube	disabled	3rd party (AMD)
auto-pause	minikube	disabled	minikube
cloud-spanner	minikube	disabled	Google
csi-hostpath-driver	minikube	disabled	Kubernetes
dashboard	minikube	enabled <input checked="" type="checkbox"/>	Kubernetes
default-storageclass	minikube	enabled <input checked="" type="checkbox"/>	Kubernetes
efk	minikube	disabled	3rd party (Elastic)
freshpod	minikube	disabled	Google
gcp-auth	minikube	disabled	Google
gvvisor	minikube	disabled	minikube
headlamp	minikube	disabled	3rd party (kinvolk.io)
inaccel	minikube	disabled	3rd party (InAccel [info@inaccel.com])
ingress	minikube	disabled	Kubernetes
ingress-dns	minikube	disabled	minikube
inspektor-gadget	minikube	disabled	3rd party (inspektor-gadget.io)
istio	minikube	disabled	3rd party (Istio)
istio-provisioner	minikube	disabled	3rd party (Istio)
kong	minikube	disabled	3rd party (Kong HQ)
kubeflow	minikube	disabled	3rd party
kubetail	minikube	disabled	3rd party (kubetail.com)
kubevirt	minikube	disabled	3rd party (KubeVirt)
logviewer	minikube	disabled	3rd party (unknown)
metallb	minikube	disabled	3rd party (MetallLB)
metrics-server	minikube	disabled	Kubernetes
nvidia-device-plugin	minikube	disabled	3rd party (NVIDIA)
nvidia-driver-installer	minikube	disabled	3rd party (NVIDIA)
nvidia-gpu-device-plugin	minikube	disabled	3rd party (NVIDIA)
olm	minikube	disabled	3rd party (Operator Framework)
pod-security-policy	minikube	disabled	3rd party (unknown)
portainer	minikube	disabled	3rd party (Portainer.io)
registry	minikube	disabled	minikube
registry-aliases	minikube	disabled	3rd party (unknown)
registry-creds	minikube	disabled	3rd party (UPMC Enterprises)
storage-provisioner	minikube	enabled <input checked="" type="checkbox"/>	minikube
storage-provisioner-gluster	minikube	disabled	3rd party (Gluster)
storage-provisioner-rancher	minikube	disabled	3rd party (Rancher)
volcano	minikube	disabled	third-party (volcano)
volumesnapshots	minikube	disabled	Kubernetes
yakd	minikube	disabled	3rd party (marcnuri.com)

```
C:\Users\cosha>minikube start -p aged --kubernetes-version=v1.16.1
* [aged] minikube v1.37.0 on Microsoft Windows 11 Home 10.0.26200.7462 Build 26200.7462
! Specified Kubernetes version 1.16.1 is less than the oldest supported version: v1.28.0. Use `minikube config defaults kubernetes-version` for details.
! You can force an unsupported Kubernetes version via the --force flag

X Exiting due to K8S_OLD_UNSUPPORTED: Kubernetes 1.16.1 is not supported by this release of minikube
```

```
C:\Users\cosha>minikube stop
* Stopping node "minikube" ...
* Powering off "minikube" via SSH ...
* 1 node stopped.
```

```
C:\Users\cosha>minikube delete --all
* Deleting "minikube" in docker ...
* Removing C:\Users\cosha\.minikube\machines\minikube ...
* Removed all traces of the "minikube" cluster.
* Removed all traces of the "aged" cluster.
* Successfully deleted all profiles
```