



Univerza v Mariboru

Fakulteta za elektrotehniko,
računalništvo in informatiko

Projektna naloga 1

(ni imena?)

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23.04.2023, Maribor

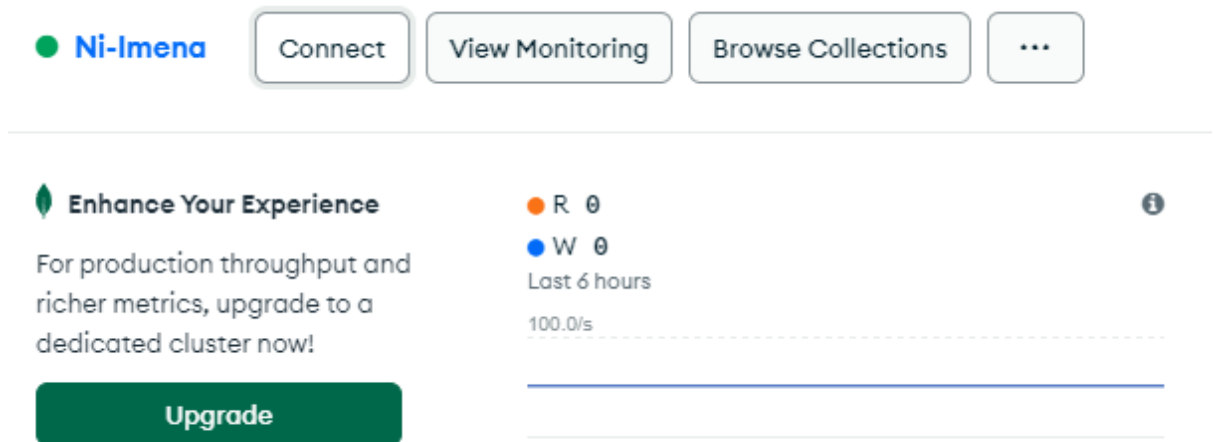
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1. Namestitev v Docker-ju

1.1. Namestitev MongoDB

Najprej smo ustvarili račun na spletni strani MongoDB in nato ustvarili novo podatkovno bazo za naš projekt (Slika 1). V bazo smo dodali ustrezne kolekcije in dokumente, ki jih potrebujemo za spletno stran. Nato smo povabili še ostale člane skupine, da lahko vsi dostopamo do baze.



Slika 1 - Ustvarjena baza projekta

Find a user	Q				
Display Name	Email Address	Project Role	Created	Last Login	
Denis Železnik	denis.zeleznik1@student.um.si	Project Owner	04/23/23 - 07:18:40 PM	04/24/23 - 08:20:25 AM	 
PENDING INVITE	domen.hribernik@student.um.si	--invite sent--	04/23/23 - 07:31:27 PM		
PENDING INVITE	merisa.mustajbasic@student.um.si	--invite sent--	04/23/23 - 07:31:27 PM		

Slika 2 - povabljeni člani skupine

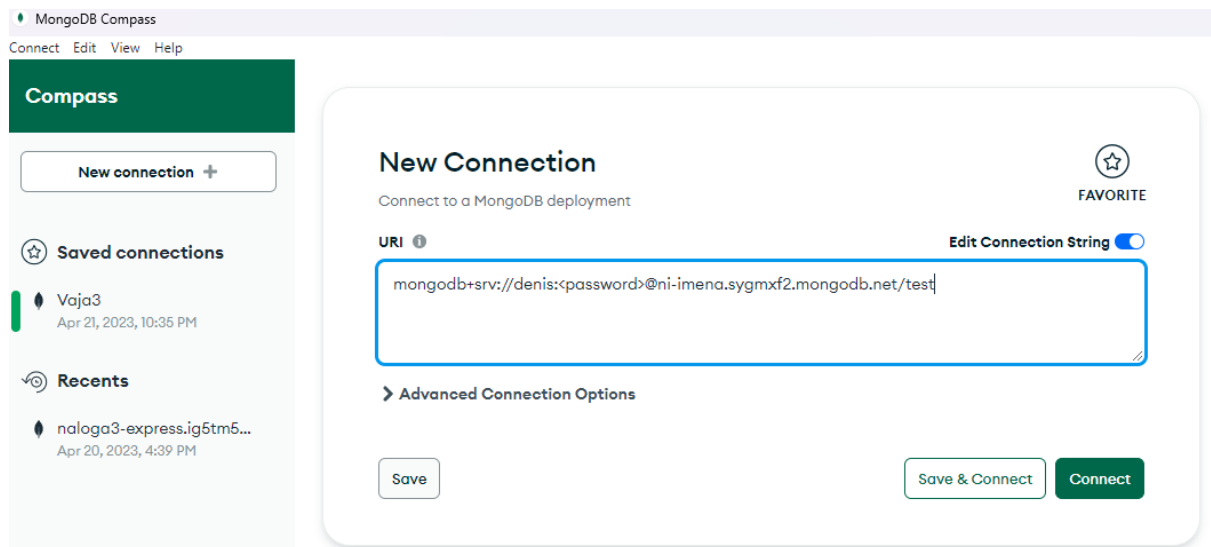
Naslednji korak je bil namestitev orodja MongoDB Compass, ki omogoča pregled in upravljanje z našo podatkovno bazo (Slika 3).

2 Copy the connection string, then open MongoDB Compass.

```
mongodb+srv://denis:<password>@ni-imenas.sygmxf2.mongodb.net/test
```

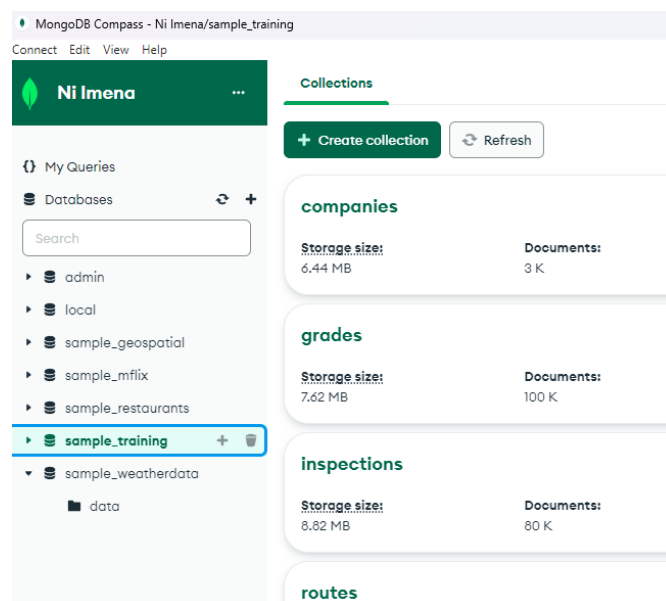
You will be prompted for the password for the **denis** user's (Database User) username.
When entering your password, make sure that any special characters are [URL encoded](#).

Slika 3 – link za povezavo na MongoDB compass



Slika 4 - povezava na MongoDB Compass

Po povezavi z bazo smo se prepričali, da je baza vidna in delujoča (Slika 5).



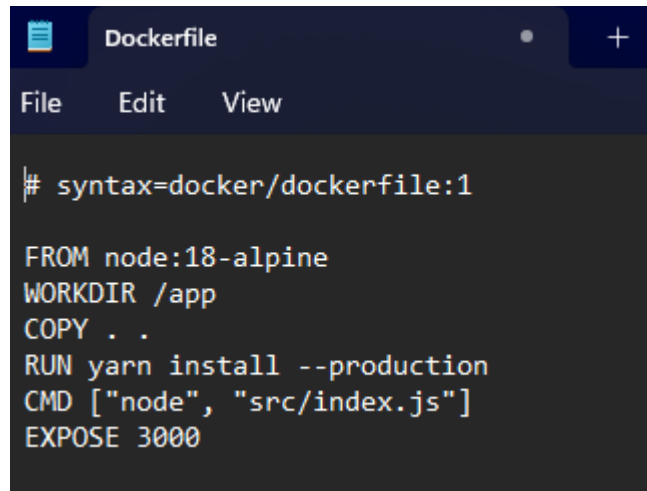
Slika 5 - vidna in delujoča baza na MongoDB Compass

1.2. Docker in GitHub

spec	23/04/2023 22:28	File folder	
src	23/04/2023 22:28	File folder	
Dockerfile	23/04/2023 21:44	File	1 KB
package.json	20/04/2023 15:58	JSON Source File	1 KB
yarn.lock	20/04/2023 15:58	LOCK File	148 KB

Slika 6 - kloniran projekt z GitHuba

Za nadaljevanje smo potrebovali Docker, ki smo ga namestili na naš računalnik. Po namestitvi smo klonirali naš projekt iz Githuba (Slika 6) in dodali potrebne datoteke ter Dockerfile (Slika 7 - vsebina Dockerfile datoteke) za node.js, ki je vseboval osnovna navodila za namestitev in konfiguracijo.



```

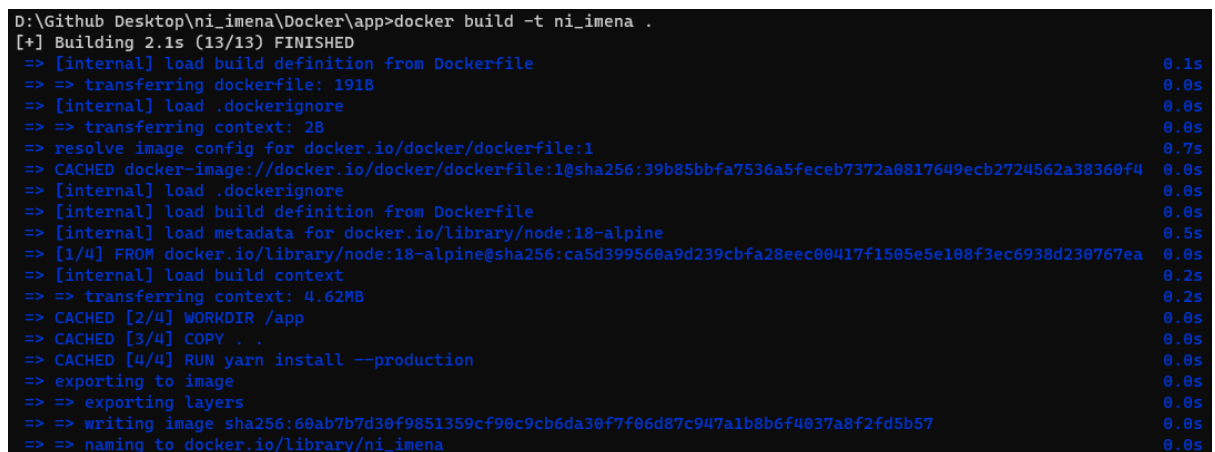
# syntax=docker/dockerfile:1

FROM node:18-alpine
WORKDIR /app
COPY . .
RUN yarn install --production
CMD ["node", "src/index.js"]
EXPOSE 3000

```

Slika 7 - vsebina Dockerfile datoteke

Nato smo izvedli ukaz za izgradnjo Docker slike (Slika 8 - izvedba ukaza za izgradnjo Docker image), ki je vsebovala našo spletno stran in vse potrebne odvisnosti. Ko je slika bila uspešno zgrajena (Slika 9 - izgrajen Docker image), smo jo uporabili za ustvarjanje Docker kontejnerja.

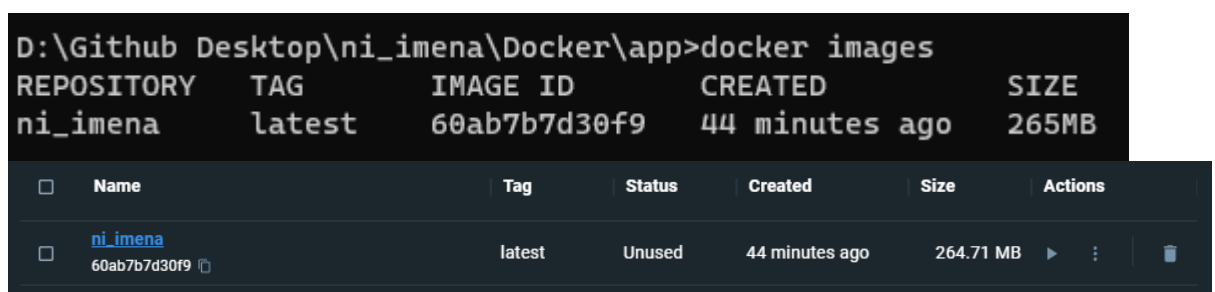


```

D:\Github Desktop\ni_imena\docker\app>docker build -t ni_imena .
[+] Building 2.1s (13/13) FINISHED
=> [internal] load build definition from Dockerfile 0.1s
=> => transferring dockerfile: 191B 0.0s
=> [internal] load .dockerignore 0.0s
=> => transferring context: 2B 0.0s
=> resolve image config for docker.io/docker/dockerfile:1 0.7s
=> CACHED docker-image://docker.io/docker/dockerfile:1@sha256:39b85bbfa7536a5feceb7372a0817649ecb2724562a38360f4 0.0s
=> [internal] load .dockerignore 0.0s
=> [internal] load build definition from Dockerfile 0.0s
=> [internal] load metadata for docker.io/library/node:18-alpine 0.5s
=> [1/4] FROM docker.io/library/node:18-alpine@sha256:ca5d399560a9d239cbfa28eeca00417f1505e5e108f3ec6938d230767ea 0.0s
=> [internal] load build context 0.2s
=> => transferring context: 4.62MB 0.2s
=> CACHED [2/4] WORKDIR /app 0.0s
=> CACHED [3/4] COPY . . 0.0s
=> CACHED [4/4] RUN yarn install --production 0.0s
=> exporting to image 0.0s
=> exporting layers 0.0s
=> writing image sha256:60ab7b7d30f9851359cf90c9cb6da30f7f06d87c947a1b8b6f4037a8f2fd5b57 0.0s
=> naming to docker.io/library/ni_imena 0.0s

```

Slika 8 - izvedba ukaza za izgradnjo Docker image

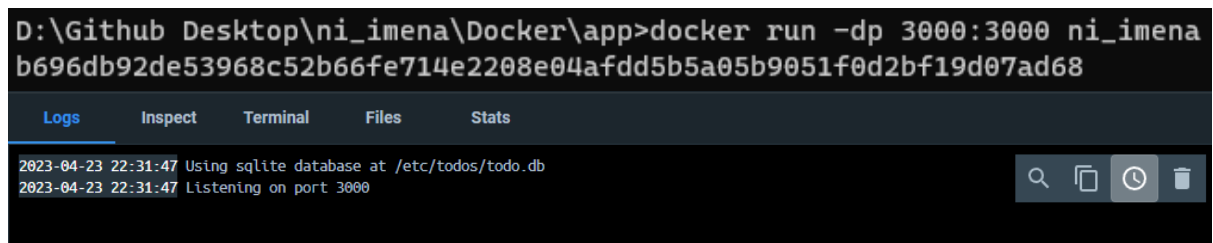


REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
ni_imena	latest	60ab7b7d30f9	44 minutes ago	265MB

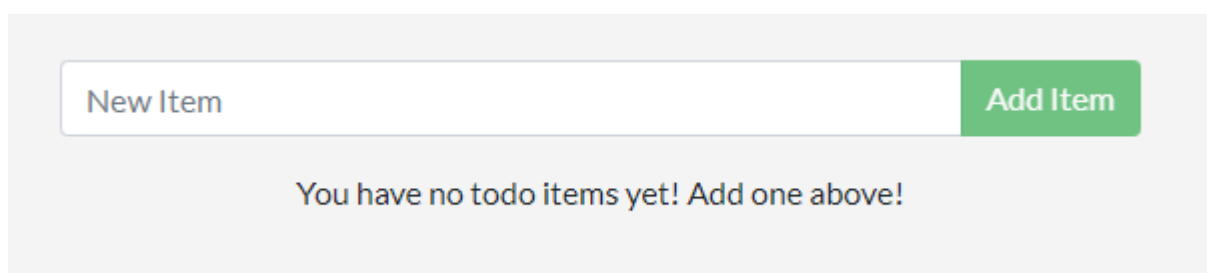
Name	Tag	Status	Created	Size	Actions
ni_imena	latest	Unused	44 minutes ago	264.71 MB	▶ ⋮ 🗑

Slika 9 - izgrajen Docker image

Kontejner je bil uspešno ustvarjen in smo ga zagnali na lokalnem računalniku preko localhost:3000 (Slika 10 - izgrajen kontejner za spletno stran). Spletna stran je sedaj delujoča in dostopna preko spletnega brskalnika (Slika 11).



Slika 10 - izgrajen kontejner za spletno stran



Slika 11 - delujoča spletna stran nameščena prek Docker-ja

Na koncu smo še pushali naše spremembe na Github, da lahko vsi člani naše skupine dostopajo do najnovejše različice kode.

2. Vzpostavitev Azure VM

2.1. Kreiranje VM

Slika 12 - napaka pri vzpostavitvi, račun ni aktiven

Po uspešni registraciji za brezplačnih 100 evrov storitev na Microsoft Azure (Slika 13), namestimo navidezni stroj kot je opisano v navodilima (Slika 14).

Slika 13 - unovčitev brezplačnih storitev na Microsoft Azure

Microsoft Azure Search resources, services, and docs (5/17)

Home > Free services >

Create a virtual machine

Basics Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription: Azure for Students
Resource group: (New) Resource group [Create new](#)

Instance details
Virtual machine name: ni-imena
Region: (US) East US
Image: Red Hat Enterprise Linux 7.4 - x64 Gen1
Size: Standard B1s - 1 vcpu, 1 GiB memory (Loading price...) [See all sizes](#)

Administrator account
Authentication type: ☒ SSH public key ☐ Password
Azure now automatically generates an SSH key pair for you and allows you to store it for future use. It is a fast, simple, and secure way to connect to your virtual machine.

[Review + create](#) [< Previous](#) [Next >](#) [Give feedback](#)

Slika 14 - specifikacije navideznega stroja

Microsoft Azure Search resources, services, and docs (5/17)

Home > Free services >

Create a virtual machine

Validation passed

Basics Tags Review + create

You have set SSH port(s) open to the Internet. This is only recommended for testing. If you want to change this setting, go back to Basics tab.

Ubuntu Server 16.04 LTS image
Standard B1s
1 vcpu, 1 GiB memory

Basics
Subscription: Azure for Students
Resource group: ni-imena
Virtual machine name: ni-imena
Region: West Europe
Image: Ubuntu Server 16.04 LTS - Gen1
Size: Standard B1s (1 vcpu, 1 GiB memory)
Authentication type: Password
Username: ni-imena-admin
Public inbound ports: SSH
Azure Spot: No

[Create](#) [< Previous](#) [Next >](#) [Download a template for automation](#) [Give feedback](#)

Slika 15 - overview VM-a

Ko smo preverili vse podane informacije in specifikacije, začnemo proces deploymenta našega stroja (Slika 16). Po končanem deployment-u smo uspešno naredili Linux navidezni stroj (Slika 17).

Microsoft Azure Search resources, services, and docs (5/17)

Home >

CreateVm-canonical.UbuntuServer-16.04-LTS-20230425124603 | Overview

Deployment

Deployment name: CreateVm-canonical.UbuntuServer-16.04-LTS-2... Start time: 4/25/2023, 12:47:03 PM
Subscription: Azure for Students Correlation ID: 7e741897-3a1c-4fbc-bd90-fac137258431
Resource group: ni-imena

Deployment details

Resource	Type	Status	Operation details
ni-imena	Microsoft.Compute/VirtualMachines	Created	Operation details
ni-imena359	Microsoft.Network/networkInterfaces	Created	Operation details
ni-imena-ip	Microsoft.Network/publicIpAddresses	OK	Operation details
ni-imena-nsg	Microsoft.Network/networkSecurityGroups	OK	Operation details
ni-imena-vnet	Microsoft.Network/virtualNetworks	OK	Operation details

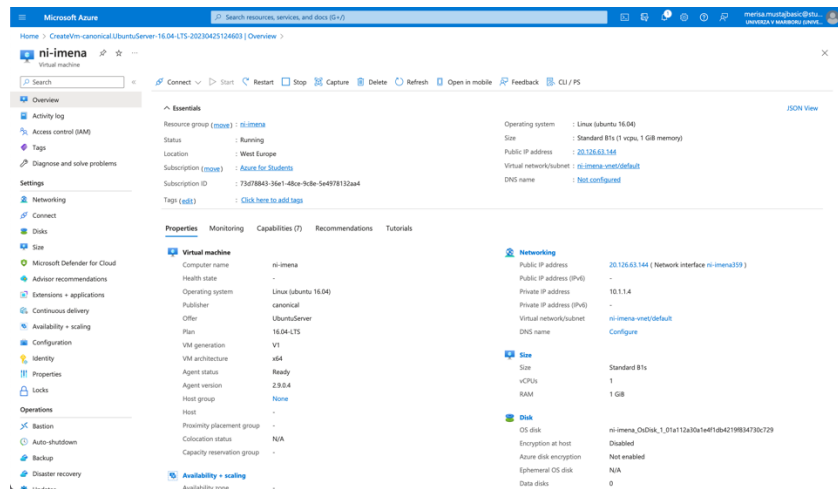
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Secure your apps and infrastructure
[Go to Microsoft Defender for Cloud](#)

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Work with an expert
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.
[Find an Azure expert >](#)

Slika 16 - deployment VM-a



Slika 17 - ustvarjen VM

SSH dostop za vse člane je zagotovljen preko javnega IP naslova:

```
C:\Users\Domen>ssh ni-imeni-admin@20.126.63.144
ni-imeni-admin@20.126.63.144's password:
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.15.0-1113-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

UA Infra: Extended Security Maintenance (ESM) is not enabled.

1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

186 additional security updates can be applied with UA Infra: ESM
Learn more about enabling UA Infra: ESM service for Ubuntu 16.04 at
https://ubuntu.com/16-04

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

New release '18.04.6 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Wed Apr 26 20:31:45 2023 from 189.182.226.177
ni-imeni-admin@ni-imeni:~$

C:\Users\denis>ssh ni-imeni-admin@20.126.63.144
The authenticity of host '20.126.63.144 (20.126.63.144)' can't be established.
ED25519 key fingerprint is SHA256:HCuqWfZAnpu4h7BqI9uv7s36ghHWHHaxhTDA9pvegi.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '20.126.63.144' (ED25519) to the list of known hosts.
ni-imeni-admin@20.126.63.144's password:
Welcome to Ubuntu 16.04.7 LTS (GNU/Linux 4.15.0-1113-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

UA Infra: Extended Security Maintenance (ESM) is not enabled.

1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

185 additional security updates can be applied with UA Infra: ESM
Learn more about enabling UA Infra: ESM service for Ubuntu 16.04 at
https://ubuntu.com/16-04

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

New release '18.04.6 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Wed Apr 26 19:48:38 2023 from 46.123.250.45
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ni-imeni-admin@ni-imeni:~$

merisa — ni-imeni-admin@ni-imeni: ~ — ssh ni-imeni-admin@20.126.63.144 — 80x24
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

WARNING! Your environment specifies an invalid locale.
The unknown environment variables are:
LC_CTYPE=UTF-8 LC_ALL=
This can affect your user experience significantly, including the
ability to manage packages. You may install the locales by running:

    sudo apt-get install language-pack-UTF-8
or
    sudo locale-gen UTF-8

To see all available language packs, run:
    apt-cache search "^language-pack-[a-z][a-z]$"
To disable this message for all users, run:
    sudo touch /var/lib/cloud/instance/locale-check.skip

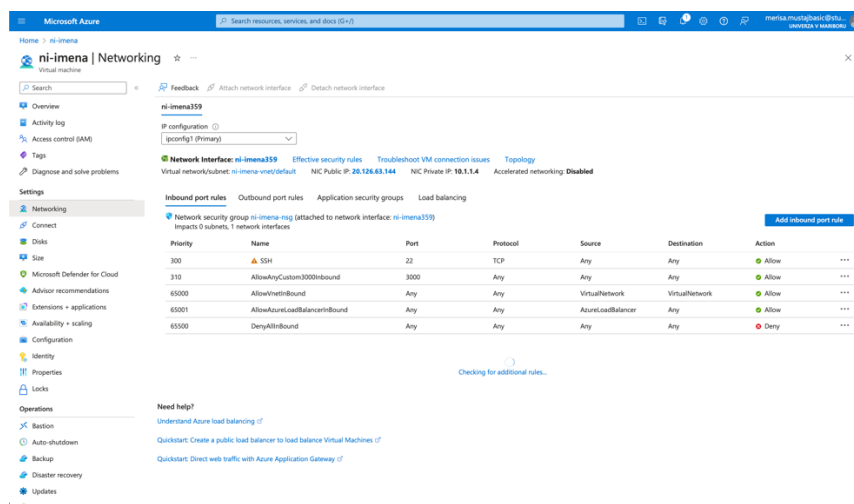
ni-imeni-admin@ni-imeni:~$
```

Slika 18 - ssh dostop vseh članov

2.2. Vprašanja o Azure portalu

Kje in kako omogočite "port forwarding" ?

V Azure portalu lahko omogočimo "port forwarding" za navidezno napravo (virtual machine) tako, da v meniju navidezne naprave izberemo možnost "Networking". Nato izberemo "Add inbound port rule" in nastavimo pravila za "port forwarding" glede na naše potrebe. Na primer, mi smo rabili omogočiti promet na portu 3000 kako bi lahko dostopali do njega preko javnega IP naslova, zato smo dodali pravilo ki nam to omogoči.



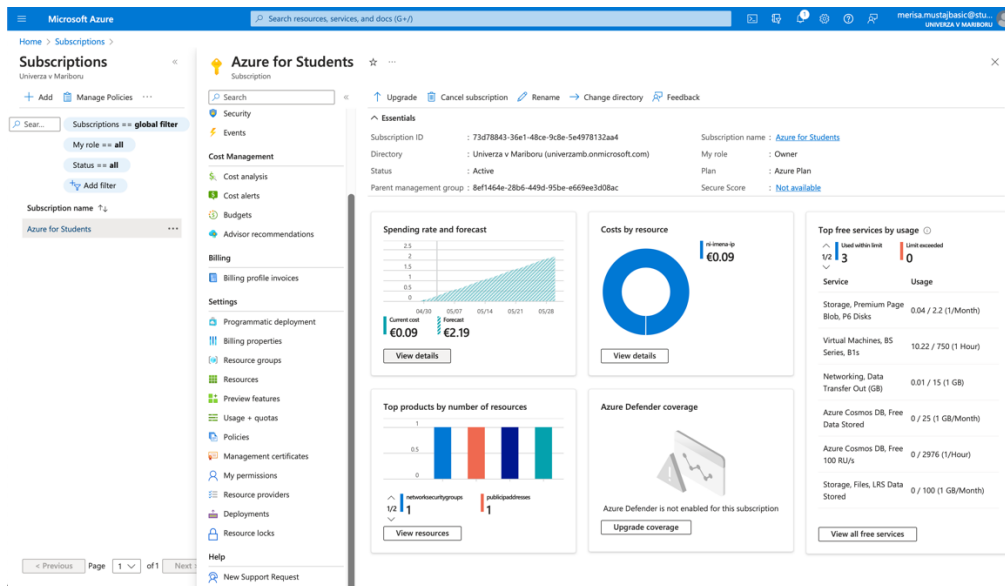
Slika 19 - port forwarding

Kakšen tip diska je bil dodan vaši navidezni napravi in kakšna je njegova kapaciteta ?

V meniju navidezne naprave v Azure portalu lahko preverimo tip diska, ki je bil dodan naši navidezni napravi, tako da kliknemo na "Disks". Tam vidimo seznam diskov, ki so na voljo za navidezno napravo, vključno z njihovo kapaciteto in tipom diska (npr. HDD ali SSD). V našem primeru vrsta diska je Premium SSD LRS in kapaciteta 64 GB.

Kje preverimo stanje trenutne porabe virov v naši naročnini ("Azure for students") ?

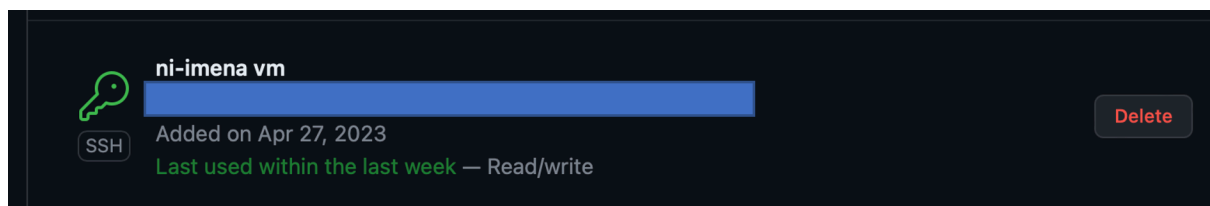
V Azure portalu lahko preverimo trenutno porabo virov v naši naročnini tako, da izberemo možnost "Cost Management + Billing" v levem meniju.



Slika 20 - poraba virov

2.3. Vzpostavitev Docker aplikacije

Uporaba git-a za prenos kode



Slika 21 - git za prenos kode projekta

Omogočimo najprej ssh povezavo torej naredimo keygen ki ga dodamo na github ki gostuje organizacijo za projekt. Z tem lahko kloniramo repozitorije prek SSH.

Namestite vse potrebne pakete za vašo aplikacijo

Nameščen je docker, mongocli, node itd.

Struktura projekta je prikazana

```

ni-imena-admin@ni-imena:~$ cd SPLETNO_PROGRAMIRANJE/
ni-imena-admin@ni-imena:~/SPLETNO_PROGRAMIRANJE$ ls
Dockerfile  bin          node_modules  public        views
README.md   controllers  package-lock.json  routes
app.js      models      package.json   verifyJWT.js
ni-imena-admin@ni-imena:~/SPLETNO_PROGRAMIRANJE$ docker build -t pn1 .
Sending build context to Docker daemon  40.18MB
Step 1/7 : FROM node:18
----> c9e4d88ad304
Step 2/7 : WORKDIR /SPLETNO_PROGRAMIRANJE
----> Using cache
----> 5d0696a8c396
Step 3/7 : COPY package*.json ./
----> Using cache
----> 55a6069ce298
Step 4/7 : RUN npm install
----> Using cache
----> 3ed2a90c56b8
Step 5/7 : COPY . /SPLETNO_PROGRAMIRANJE
----> 94368cfaf614
Step 6/7 : EXPOSE 3000
----> Running in 34d79d77665a
Removing intermediate container 34d79d77665a
----> 8dcc2cbec7b8
Step 7/7 : CMD ["npm", "run", "dev"]
----> Running in aa3192eb65c4
Removing intermediate container aa3192eb65c4
----> 6853b7577038
Successfully built 6853b7577038
Successfully tagged pn1:latest
ni-imena-admin@ni-imena:~/SPLETNO_PROGRAMIRANJE$ hstr

```

Slika 22 - struktura folderja, Dockerfile ipd

Omogočite dostopnost vaše aplikacije iz javnega omrežja

Z ukazom „docker run“ zaženemo naš container in je aplikacija potem dostopna preko javnega naslova VM-a, s dodano številko vrat (v našem primeru je to 3000).

Stop
Capture
Delete
Refresh
Open in mobile
Feedback
CLI / PS

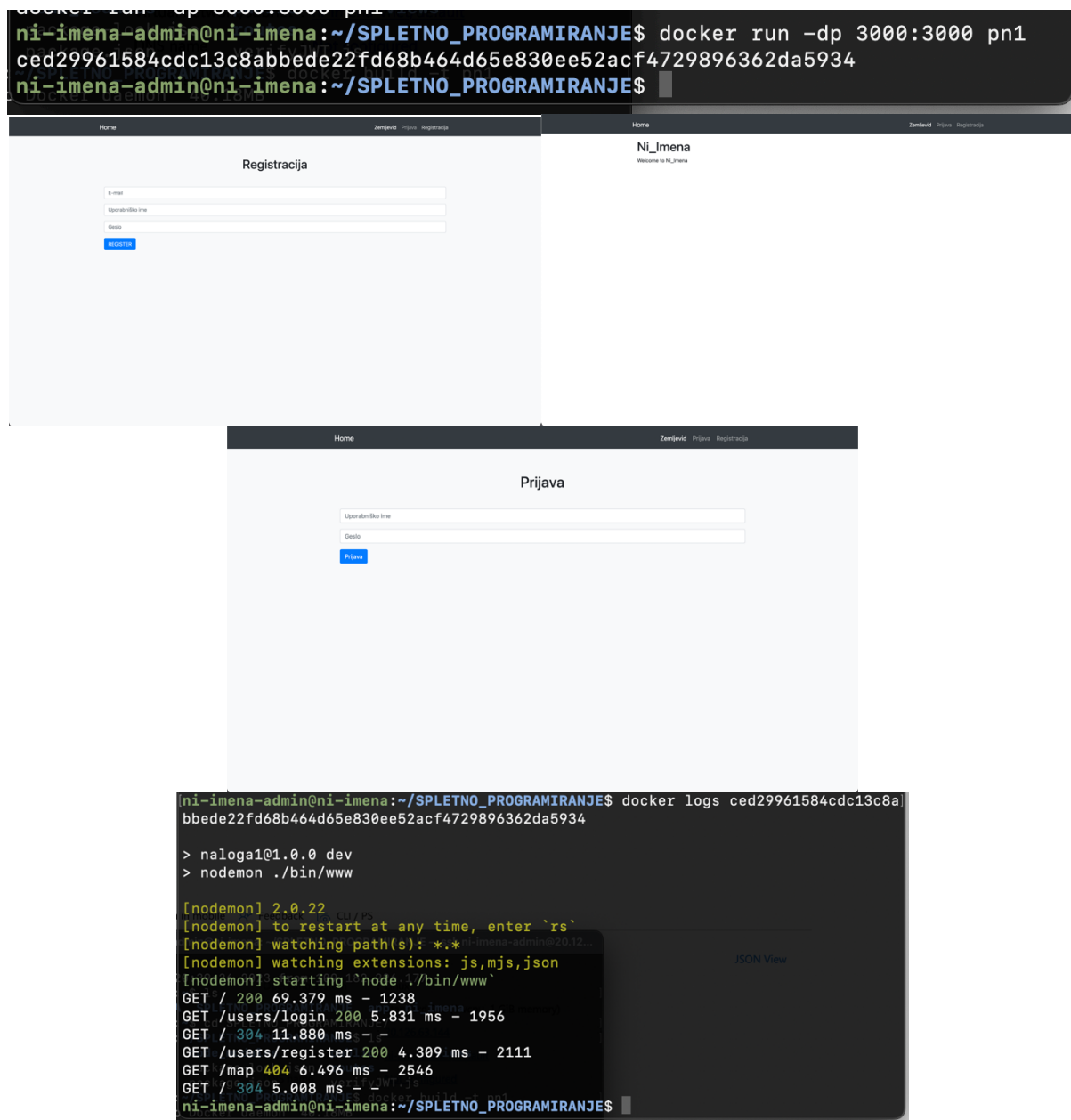
merisa — ni-imena-admin@ni-imena: ~/SPLETNO_PROGRAMIRANJE — ssh ni-imena-admin@20.12...

Last login: Thu May 4 20:39:26 2023 from 109.182.226.177
ni-imena-admin@ni-imena:~\$ ls
SYSTEMSKA_ADMINISTRACIJA SPLETNO_PROGRAMIRANJE app ni-imena
ni-imena-admin@ni-imena:~\$ cd SPLETNO_PROGRAMIRANJE/
ni-imena-admin@ni-imena:~/SPLETNO_PROGRAMIRANJE\$ ls
Dockerfile bin node_modules public views
README.md controllers package-lock.json routes
app.js models package.json verifyJWT.js
ni-imena-admin@ni-imena:~/SPLETNO_PROGRAMIRANJE\$ docker build -t pn1 .
Sending build context to Docker daemon 40.18MB
Step 1/7 : FROM node:18
----> c9e4d88ad304
Step 2/7 : WORKDIR /SPLETNO_PROGRAMIRANJE
----> Using cache
----> 5d0696a8c396
Step 3/7 : COPY package*.json ./
----> Using cache
----> 55a6069ce298
Step 4/7 : RUN npm install
----> Using cache
----> 3ed2a90c56b8
Step 5/7 : COPY . /SPLETNO_PROGRAMIRANJE

Networking
Public IP address 20.126.63.144 (Network interface ni-imena359)
Public IP address (IPv6) -
Private IP address 10.1.1.4
Private IP address (IPv6) -
Virtual network/subnet ni-imena-vnet/default
DNS name Configure

JSON View

10



Slika 23 - dostop preko javnega IP naslova in številke vrat