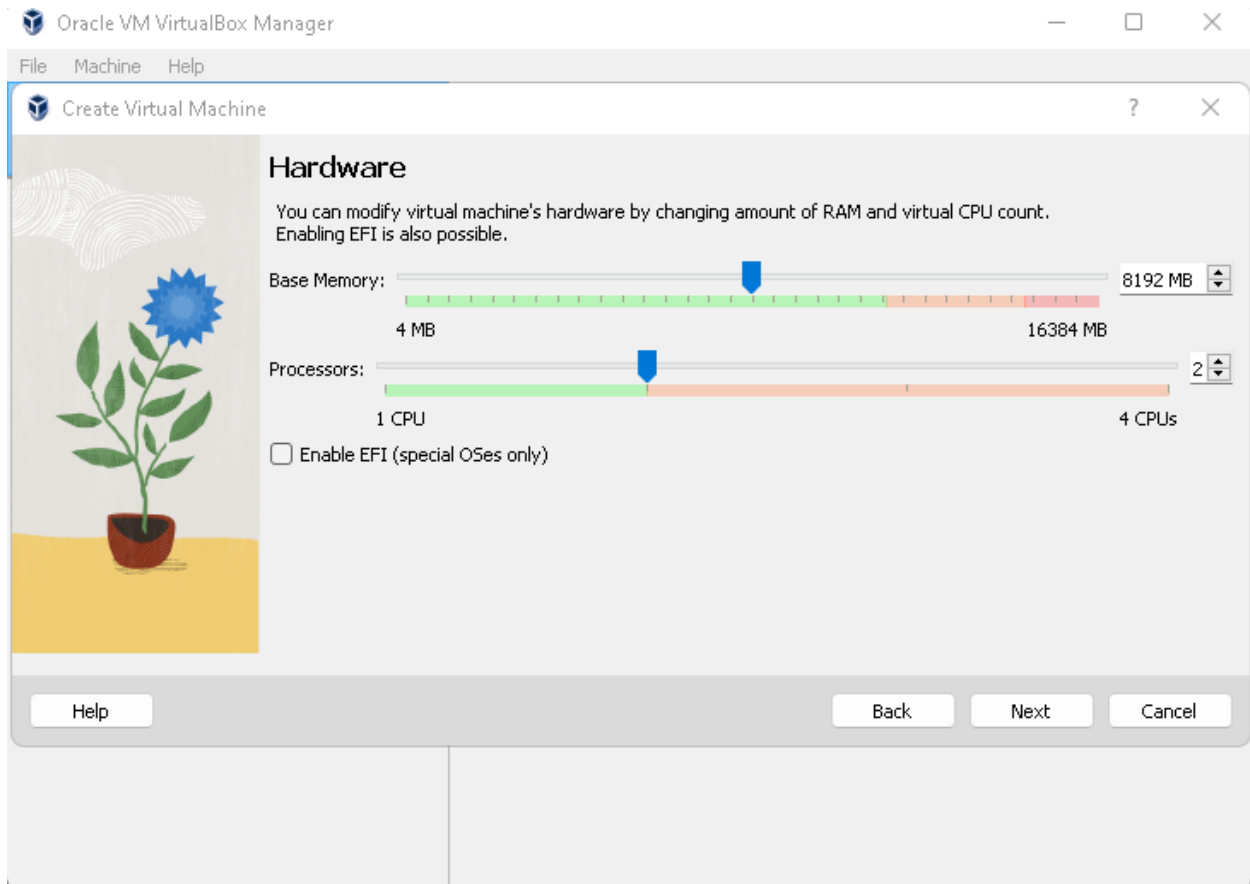
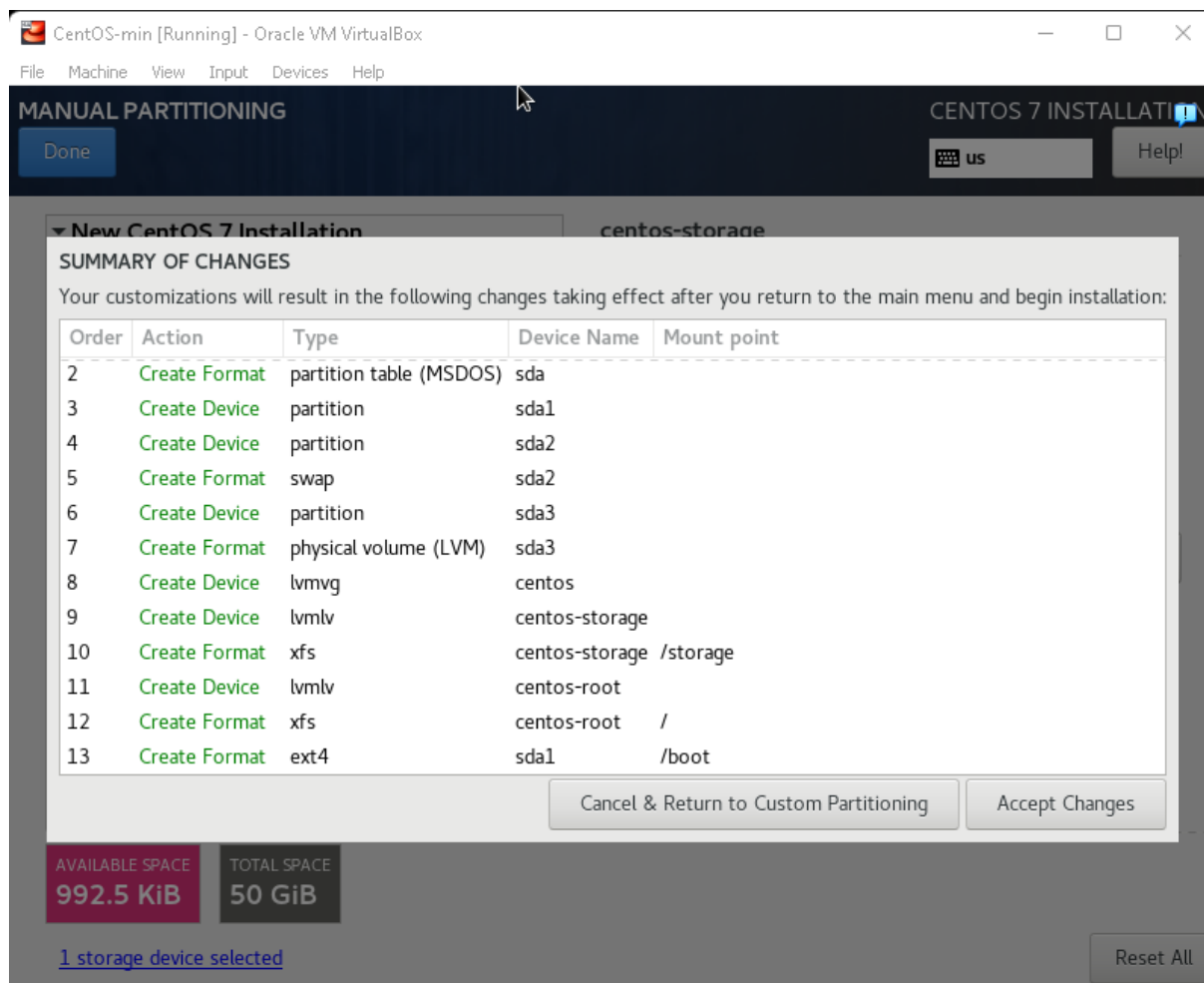


1. Kreiranje virtuelne mašine

Odabir RAM memorije i CPU



Kreiranje particija na slici ispod



1.1. Podesavanje Linuxa i instalacija docker-a

Disable selinux i prikaz hostname-a

```
CentOS-min [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
[root@docker-ivan01 ~]# cat /etc/selinux/config
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#   enforcing - SELinux security policy is enforced.
#   permissive - SELinux prints warnings instead of enforcing.
#   disabled - No SELinux policy is loaded.
SELINUX=disabled
# SELINUXTYPE= can take one of three values:
#   targeted - Targeted processes are protected,
#   minimum - Modification of targeted policy. Only selected processes are protected.
#   mls - Multi Level Security protection.
SELINUXTYPE=targeted

[root@docker-ivan01 ~]# hostnamectl
  Static hostname: docker-ivan01
        Icon name: computer-vm
        Chassis: vm
        Machine ID: d397009d81b95042be231ee5dbc53436
        Boot ID: 0dc49a0e009d40e39420606b60da1cab
  Virtualization: kvm
  Operating System: CentOS Linux 7 (Core)
    CPE OS Name: cpe:/o:centos:centos:7
        Kernel: Linux 3.10.0-1160.el7.x86_64
  Architecture: x86_64
[root@docker-ivan01 ~]#
```

Prikaz konfiguracije mreze (DHCP)

```
CentOS-min [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
TYPE="Ethernet"
PROXY_METHOD="none"
BROWSER_ONLY="no"
BOOTPROTO="dhcp"
DEFROUTE="yes"
IPV4_FAILURE_FATAL="no"
IPV6INIT="yes"
IPV6_AUTOCONF="yes"
IPV6_DEFROUTE="yes"
IPV6_FAILURE_FATAL="no"
IPV6_ADDR_GEN_MODE="stable-privacy"
NAME="enp0s3"
UUID="df074067-e0a6-4b46-a59c-123c1f74bdef"
DEVICE="enp0s3"
ONBOOT="yes"
```

Nakon toga korisćena je docker dokumentacija za instalaciju Docker-a uputstvo se može naći na sledećem linku

<https://docs.docker.com/engine/install/centos/>

2. Pullovanje Docker image-a

Za pull-ovanje docker image koristiti sledeće komande:

```
docker pull jenkins/jenkins
```

```
docker pull tomcat:9.0
```

Prikazano na slici ispod

```
[root@docker-ivan01 ~]# sudo docker pull jenkins/jenkins
Using default tag: latest
latest: Pulling from jenkins/jenkins
93c2d578e421: Pull complete
77b97c2ff987: Pull complete
1536c617ae13: Pull complete
24565670b535: Pull complete
3a5e4d5386c8: Pull complete
7fdd59a5bf10: Pull complete
a410f8c85e5b: Pull complete
422a17265fab: Pull complete
d64be9b34ff6: Pull complete
6f269ecf918f: Pull complete
7442d1d88c7b: Pull complete
295549a93c31: Pull complete
d29ce47fca97: Pull complete
Digest: sha256:c9a1bba477d3b9f29c27337d7d537c0926168ab8073b07067a42dda1a35b07f4
Status: Downloaded newer image for jenkins/jenkins:latest
docker.io/jenkins/jenkins:latest
[root@docker-ivan01 ~]# sudo docker pull tomcat:9.0
9.0: Pulling from library/tomcat
9d19ee268e0d: Pull complete
f2b566cb887b: Pull complete
b375e6654ef5: Pull complete
19452d1108a6: Pull complete
b82f37793aff: Pull complete
80a89cf14365: Pull complete
1c03113c1ec7: Pull complete
Digest: sha256:0d46b4fe76c6fb7142f54c9f2934c65ead7e8c505fe97291a9c3799da9ab3f13
Status: Downloaded newer image for tomcat:9.0
docker.io/library/tomcat:9.0
[root@docker-ivan01 ~]#
```

2.2. Pokretanje Jenkins kontejnera

Koristimo komandu kako bi pokrenuli kontejner da bi instalirali jenkins i podesili korisnika username: **admin**, password: **Admin321!**

1. Porećemo kontejner kako bi kopirali fajlove za volume:

```
sudo docker run --name jenkins --rm -d -p 8080:8080 jenkins/jenkins:latest
```

2. Zatim koristimo sledecu komandu da kopiramo jenkins_home direktorijum u volume koji se nalazi na hostu

```
sudo docker cp jenkins:/var/jenkins_home /storage/jenkins-home
```

3. Menjamo permisije za ostale korisnike za direktorijume i foldere, pomocu komande date ispd koji se nalaze unutra jenkins volume-a kako bi konetejner mogao da ih koristi

```
sudo chmod -R o+rwX /storage/jenkins-home/
```

4. Stopiramo kontejner pomocu komande `sudo docker stop jenkins`

2.3. Pokretanje tomcat kontejnera

1. Porecemo kontejner kako bi kopirali fajlove za volume:

```
sudo docker run --name tomcat --rm -d -p 8888:8080 tomcat:9.0
```

2. Koristimo komandu za kopiranje tomcat direktorijuma iz kontejnera na hostu

```
sudo docker cp tomcat:/usr/local/tomcat/ /storage/tomcat-home
```

3. Kopiramo manager aplikaciju u webapps kako bi bila dostupna

```
[ivan@docker-ivan01 tomcat-home]$ ls
bin          CONTRIBUTING.md  logs          README.md     temp          work
BUILDING.txt lib             native-jni-lib RELEASE-NOTES webapps
conf         LICENSE         NOTICE       RUNNING.txt   webapps.dist
[ivan@docker-ivan01 tomcat-home]$ sudo cp -r webapps.dist/. webapps/
[ivan@docker-ivan01 tomcat-home]$ ls webapps
docs  examples  host-manager  manager  ROOT
[ivan@docker-ivan01 tomcat-home]$ _
```

4. Menjamo tomcat konfiguraciju odnosno dodajemo korisnika izmenom fajla `/storage/tomcat-home/conf/tomcat-users.xml`

```
<role rolename="manager-script"/>
<role rolename="manager-gui"/>
<user username="tom_deploy" password="12345678" roles="manager-gui,manager-script"/>
```

5. Menjamo `context.xml` fajl kako bi omogucili pristup tomcat manager aplikaciji.

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
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contributor license agreements. See the NOTICE file distributed with
this work for additional information regarding copyright ownership.
The ASF licenses this file to You under the Apache License, Version 2.0
(the "License"); you may not use this file except in compliance with
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    http://www.apache.org/licenses/LICENSE-2.0

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
-->
<Context antiResourceLocking="false" privileged="true" >
  <CookieProcessor className="org.apache.tomcat.util.http.Rfc6265CookieProcessor"
    sameSiteCookies="strict" />
  <!-- <Valve className="org.apache.catalina.valves.RemoteAddrValve"
    allow="127\.\d+\.\d+\.\d+:::1|0:0:0:0:0:0:0:1" /> -->
  <Manager sessionAttributeValueClassNameFilter="java\.lang\.(?:Boolean|Integer|Long|Number|string)|
org\.apache\.catalina\.filters\.CsrfPreventionFilter\$LruCache(?:\$1)?|java\.util\.(?:Linked)?HashMap" />
</Context>
```

6. Stopiramo kontejner pomocu komande `sudo docker stop tomcat`

3. Docker compose fajl

Da bi pokrenuli file potrebno je da se pozicioniramo u direktorijum u kome se nalazi fajl u ovom slucaju `/home/ivan/docker/docker-compose.yaml`

Zatim pokrenemo `sudo docker compose up -d` komandu.

```
version: "3"

services:
  jenkins:
    image: jenkins/jenkins:latest
    container_name: jenkins
    restart: always
    ports:
      - 8080:8080
    volumes:
      - /sotrage/jenkins-home:/var/jenkins_home

  tomcat:
    image: tomcat:9.0
    container_name: tomcat
    restart: always
    ports:
      - 8888:8080
    volumes:
```

```

- /storage/tomcat-home:/usr/local/tomcat

mysql:
  image: mysql
  container_name: mysql
  restart: always
  environment:
    MYSQL_ROOT_PASSWORD: ivan
    MYSQL_DATABASE: gogs
    MYSQL_USER: ivan
    MYSQL_PASSWORD: ivan
  volumes:
    - /storage/mysql-data:/var/lib/mysql

gogs:
  image: gogs
  container_name: gogs
  restart: always
  depends_on:
    - mysql
  ports:
    - 10080:3000
  volumes:
    - /storage/gogs-git-data:/data

nagios:
  image: manios/nagios:latest
  container_name: nagios
  restart: always
  ports:
    - 0.0.0.0:8090:80
  volumes:
    - /storage/nagios-data:/opt/nagios/etc/

```

3.1. Kopiranje podataka iz MySQL baze

1. Kreiramo direktorijum `scripts` u home direktorijumu korisnika (`/home/ivan`) pomocu sledece komande `mkdir scripts`
2. U direktorijumu kreiramo fajl `mysql-backup.sh` kao na slici ispod

```
#!/bin/bash

# Dest where to save backup files
dest="/storage/mysql-data-backup"

# Directory for backup
backup_directory="/storage/mysql-data"

# Current date
current_date=$(date +%Y-%m-%d)

# Archive file name
archive="mysql-data-$current_date.tar.gz"

sudo tar -zcvf $dest/$archive $backup_directory

echo "Finished"
```

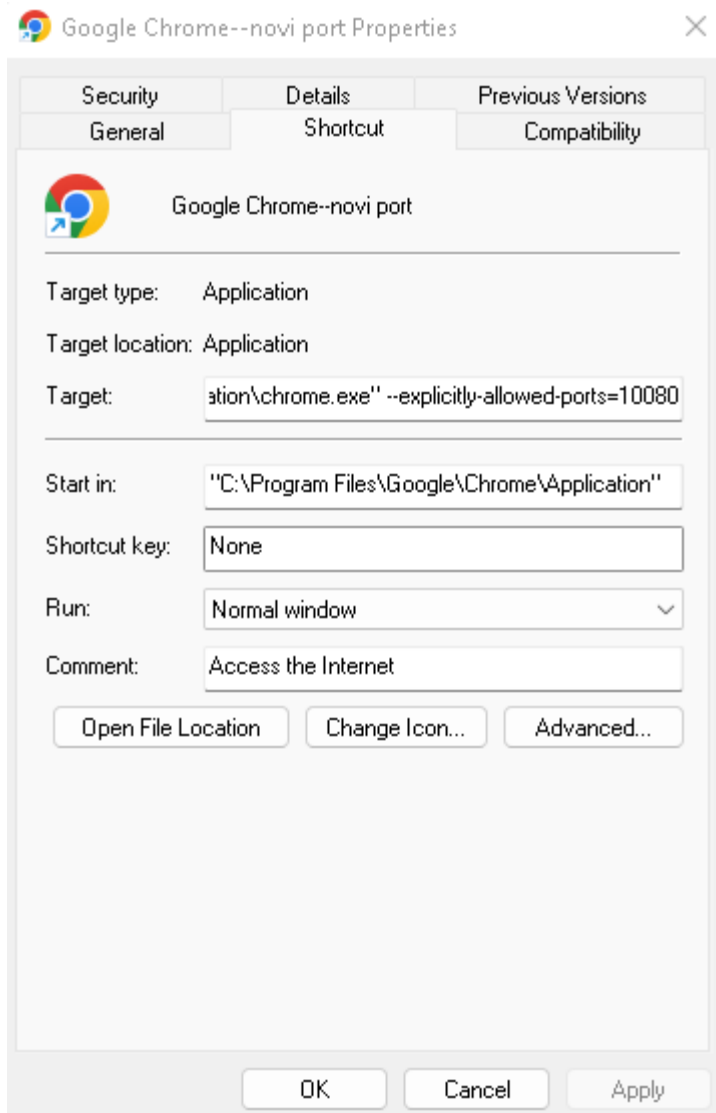
3. Promenimo privilegije pomocu komande `sudo chmod ugo+x mysql-backup.sh`
4. Otvorimo crontab pomocu sledece komande `sudo crontab -e` i dodamo sledecu liniju za izvršavanje skripte svakog dana u 8 PM

```
# Every day at 8 PM
0 20 * * * sudo bash /home/ivan/scripts/mysql-backup.sh
```

4. Instalacija gogs i Jenkins servera

4.1. Instalacija gogs servera i komitovanje projekta na server

Da bi pristupili gogs serveru preko browsera potrebno je da eksplicitno dozvolimo port 10080 u browseru jer je blokiran to se moze uraditi na sledeci nacin dodati u target *--explicitly-allowed-ports=10080*



Nakon toga mozemo pokrenuti instalaciju gogs-a u borwseru

Installation - Gogs x +

← → ↻ ⚠ Not secure | 192.168.0.21:10080/install

Install Steps For First-time Run

If you're running Gogs inside Docker, please read [Guidelines](#) carefully before you change anything in this page!

Database Settings

Gogs requires MySQL, PostgreSQL, SQLite3 or TiDB (via MySQL protocol).

Database Type*

Host*

User*

Password*

Database Name*

Please use INNODB engine with utf8_general_ci charset for MySQL.

Application General Settings

Application Name*

Put your organization name here huge and loud!

Repository Root Path*

All Git remote repositories will be saved to this directory.

Run User*

The user must have access to Repository Root Path and run Gogs.

Domain*

This affects SSH clone URLs.

SSH Port*

*Kod HOST-a je upisan mysql (naziv kontejnera MySQL baze) i pre toga je pomocu komande iz komandne linije `sudo docker exec -it mysql bash` dodeljena privilegija korisniku ivan da moze da koristi bazu namenjenu gogs-u. Nakon instalacije ulogujemo se pomocu korisnickog imena i lozinke koju smo naveli i mozemo napraviti repozitorijum

```
bash-4.4# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 12
Server version: 8.0.33 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> grant all privileges on `gogs`.* to `ivan`;
Query OK, 0 rows affected (0.02 sec)
```

Nakon toga kireramo/kloniramo repozitorijum koji je napravljen na gogs-u

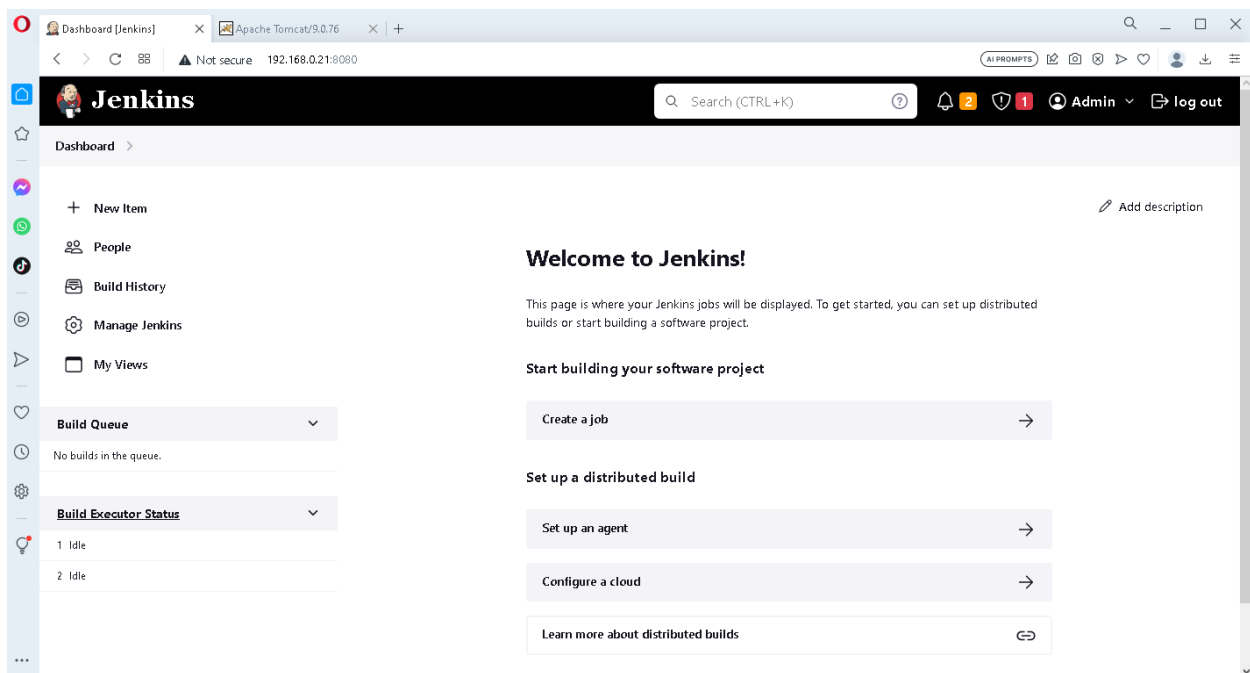
```
MyComp@DESKTOP-INJ5BML MINGW64 ~/Desktop/ivan-git
$ git clone http://192.168.0.21:10080/ivan/hello-world-war.git
Cloning into 'hello-world-war'...
warning: You appear to have cloned an empty repository.
```

Skinut projekat sa <https://github.com/efsavage/hello-world-war> komitujemo na gogs server

```
MyComp@DESKTOP-INJ5BML MINGW64 ~/Desktop/ivan-git/hello-world-war (master)
$ git push -u origin master
Enumerating objects: 13, done.
Counting objects: 100% (13/13), done.
Delta compression using up to 2 threads
Compressing objects: 100% (8/8), done.
Writing objects: 100% (13/13), 2.99 KiB | 1021.00 KiB/s, done.
Total 13 (delta 0), reused 0 (delta 0), pack-reused 0
To http://192.168.0.21:10080/ivan/hello-world-war.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.
```

4.2. Instalacija Jenkins servera i podesavanje CI/CD-a

Kada pokrenemo jenkins kontejner u borseru upisemo ip adresu i port na kome se nalazi i mozemo pokrenuti instalaciju jenkinsa, koriscena je default instalacija.



Zatim u opciji **Manage Jenkins>Tools** dodajemo instalaciju za JDK i Maven

JDK installations

JDK Installations ^ Edited

Add JDK

JDK

Name

Java

☒ Install automatically ?

Install Oracle Java SE Development Kit from the website ?

Version

Java SE Development Kit 9.0.4

☒ I agree to the Java SE Development Kit License Agreement

⚠ Oracle Java SE 11+ is not available for business, commercial or production use without a commercial license.
Public updates for Oracle Java SE 8 released after January 2019 will not be available for business, commercial or production use without a commercial license.
[Oracle Java SE Licensing FAQ](#)

Add Installer ▾

Save

Apply

Maven installations

Maven Installations ^ Edited

Add Maven

Maven

Name

Maven

☒ Install automatically ?

Install from Apache

Version

3.9.3

Add Installer ▾

Add Maven

Nakon toga kreiramo CI CD pipeline klikom na **New Item**

ivan/hello-world-war - Gogs

/manager

New Item [Jenkins]

+


← → ↻ ⚠ Not secure | 192.168.0.21:8080/view/all/newJob


Dashboard > All >


Enter an item name


Build


» Required field


**Freestyle project**
This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.


**Maven project**
Build a maven project. Jenkins takes advantage of your POM files and drastically reduces the configuration.

**Pipeline**
Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

**Multi-configuration project**
Suitable for projects that need a large number of different configurations, such as testing on multiple environments, platform-specific builds, etc.

**Folder**
Creates a container that stores nested items in it. Useful for grouping things together. Unlike view, which is just a filter, a folder creates a separate namespace, so you can have multiple things of the same name as long as they are in different folders.

**Multibranch Pipeline**
Creates a set of Pipeline projects according to detected branches in one SCM repository.

**Organization Folder**
Creates a set of multibranch project subfolders by scanning for repositories.

OK

Biramo **Maven project**

Zatim **Source Code manager > Git** i unosimo repo URL kao i kredencijale za korisnika

Source Code Management

☐ None

☒ Git ?

Repositories ?

Repository URL ?

http://192.168.0.21:10080/ivan/hello-world-war.git

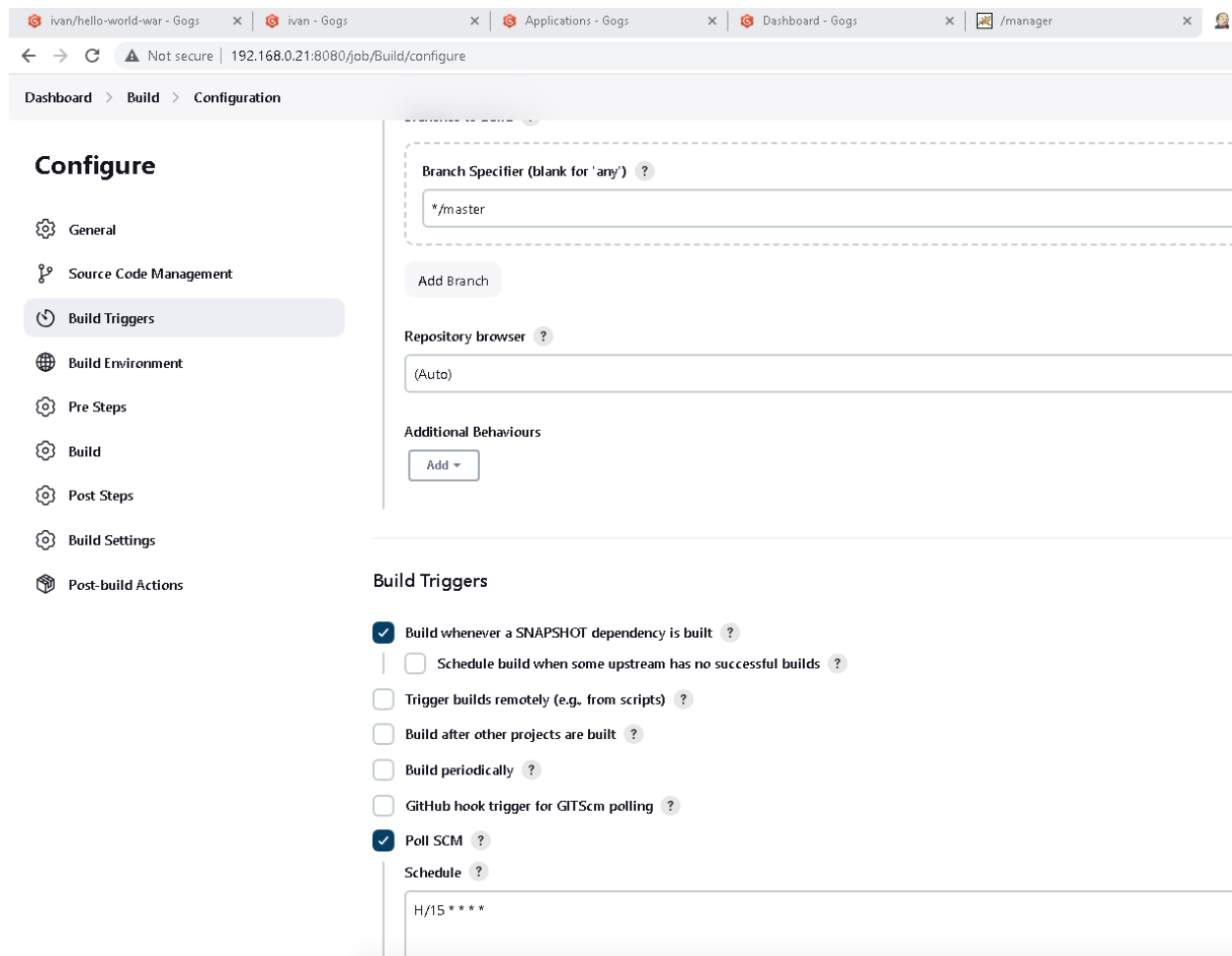
Credentials ?

ivan/*

Add

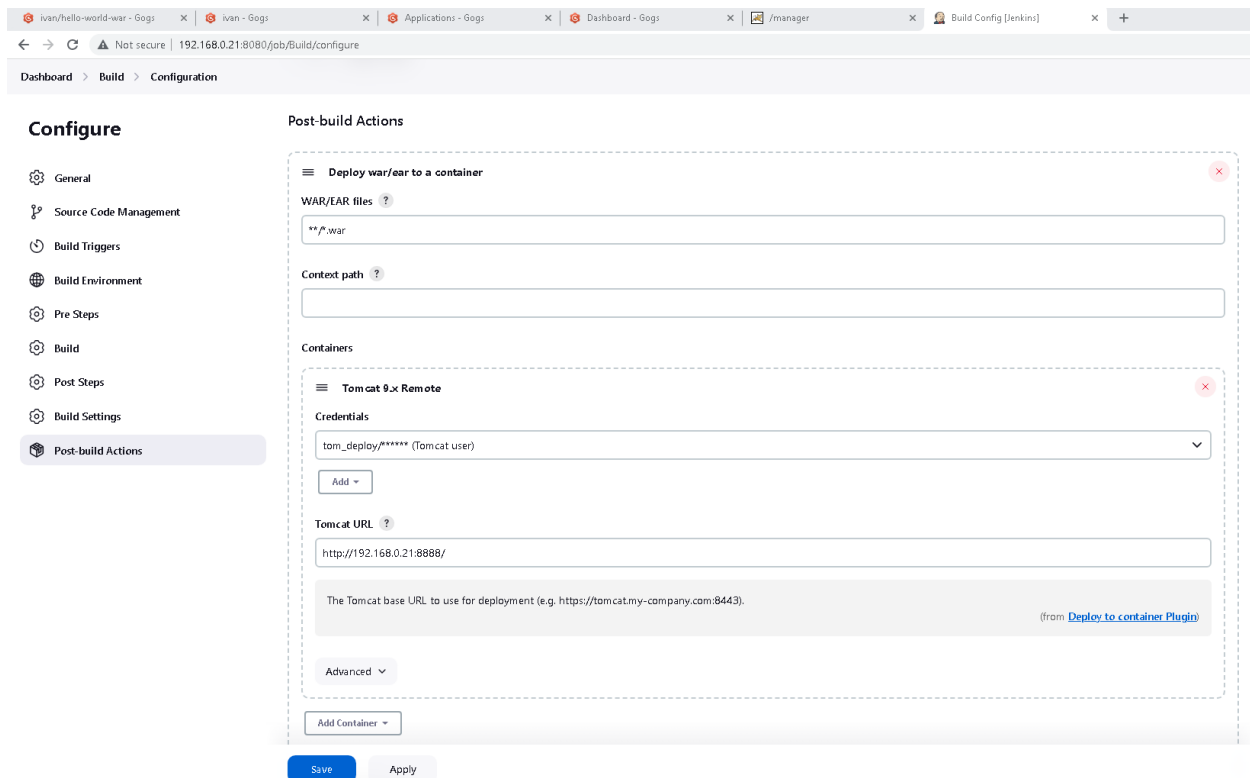
Advanced

Add Repository



Nakon toga biramo koju granu prati jenkins, i podesavamo SCM pool na svakih 15 minuta da proverava da li se desila promena u **master** grani.

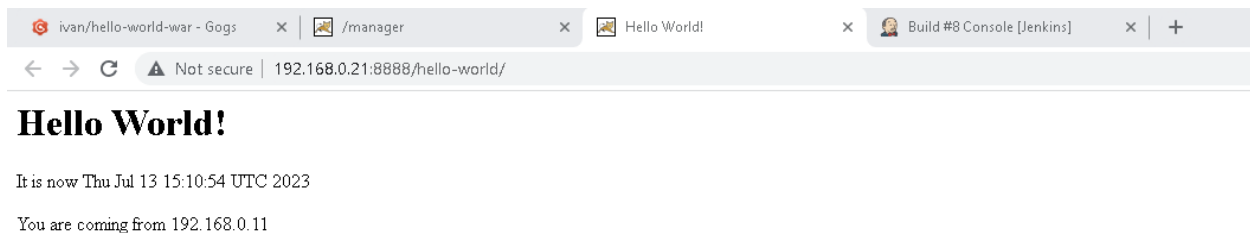
Takodje u **Post build Actions** biramo **Deploy war to a container** (prethodno instaliran plugin). Gde unosimo URL odnono ip adresu tomcat servera/containera kao i kredencijale tom_deploy user i password i sacuvamo konfiguraciju.



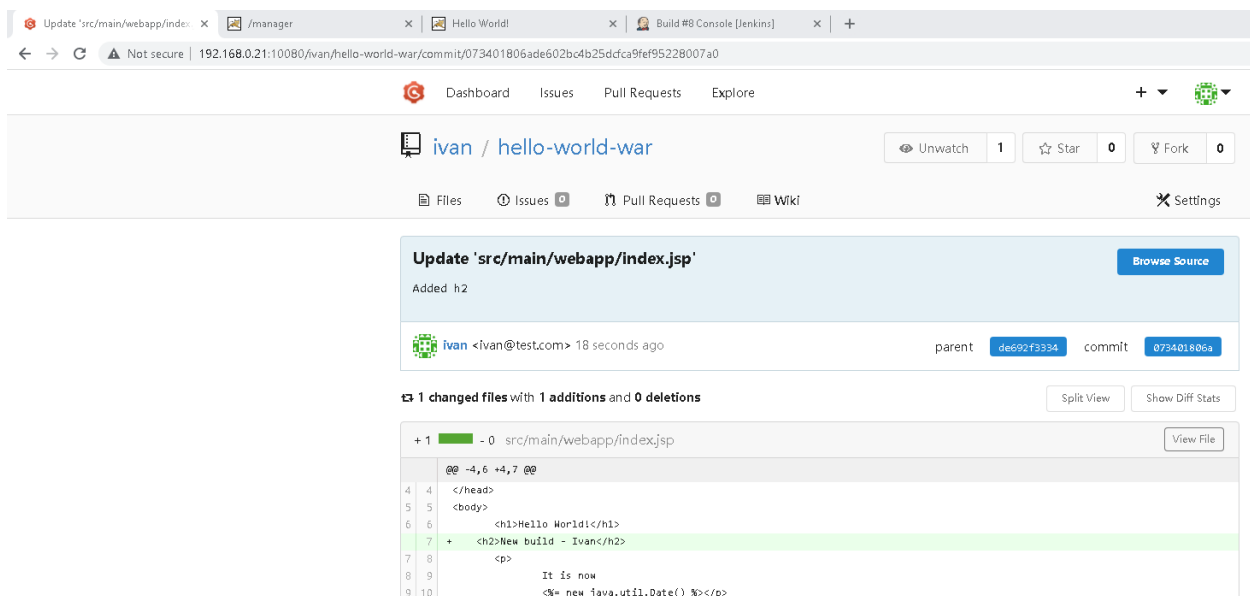
Nakon toga pocece build iz repozitorijuma i deploy na tomcat container

```
[INFO] Packaging webapp
[INFO] Assembling webapp [hello-world-war] in [/var/jenkins_home/workspace/Build/target/hello-world-war-1.0.0]
[INFO] Processing war project
[INFO] Copying webapp resources [/var/jenkins_home/workspace/Build/src/main/webapp]
[INFO] Webapp assembled in [55 msecs]
[INFO] Building war: /var/jenkins_home/workspace/Build/target/hello-world-war-1.0.0.war
[INFO] WEB-INF/web.xml already added, skipping
[INFO]
[INFO] --- install:3.1.1:install (default-install) @ hello-world-war ---
[INFO] Installing /var/jenkins_home/workspace/Build/pom.xml to /var/jenkins_home/.m2/repository/com/efsavage/hello-world-war/1.0.0/hello-world-war-1.0.0.pom
[INFO] Installing /var/jenkins_home/workspace/Build/target/hello-world-war-1.0.0.war to /var/jenkins_home/.m2/repository/com/efsavage/hello-world-war/1.0.0/hello-world-war-1.0.0.war
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 16.425 s
[INFO] Finished at: 2023-07-13T15:09:48Z
[INFO] -----
Waiting for Jenkins to finish collecting data
[JENKINS] Archiving /var/jenkins_home/workspace/Build/pom.xml to com.efsavage/hello-world-war/1.0.0/hello-world-war-1.0.0.pom
[JENKINS] Archiving /var/jenkins_home/workspace/Build/target/hello-world-war-1.0.0.war to com.efsavage/hello-world-war/1.0.0/hello-world-war-1.0.0.war
channel stopped
[DeployPublisher][INFO] Attempting to deploy 2 war file(s)
[DeployPublisher][INFO] Deploying /var/jenkins_home/workspace/Build/dist/hello-world.war to container Tomcat 9.x Remote with context null
[DeployPublisher][INFO] Deploying [/var/jenkins_home/workspace/Build/dist/hello-world.war] is not deployed. Doing a fresh deployment.
Deploying [/var/jenkins_home/workspace/Build/dist/hello-world.war]
[DeployPublisher][INFO] Deploying /var/jenkins_home/workspace/Build/target/hello-world-war-1.0.0.war to container Tomcat 9.x Remote with context null
[DeployPublisher][INFO] Deploying [/var/jenkins_home/workspace/Build/target/hello-world-war-1.0.0.war] is not deployed. Doing a fresh deployment.
Deploying [/var/jenkins_home/workspace/Build/target/hello-world-war-1.0.0.war]
Finished: SUCCESS
```

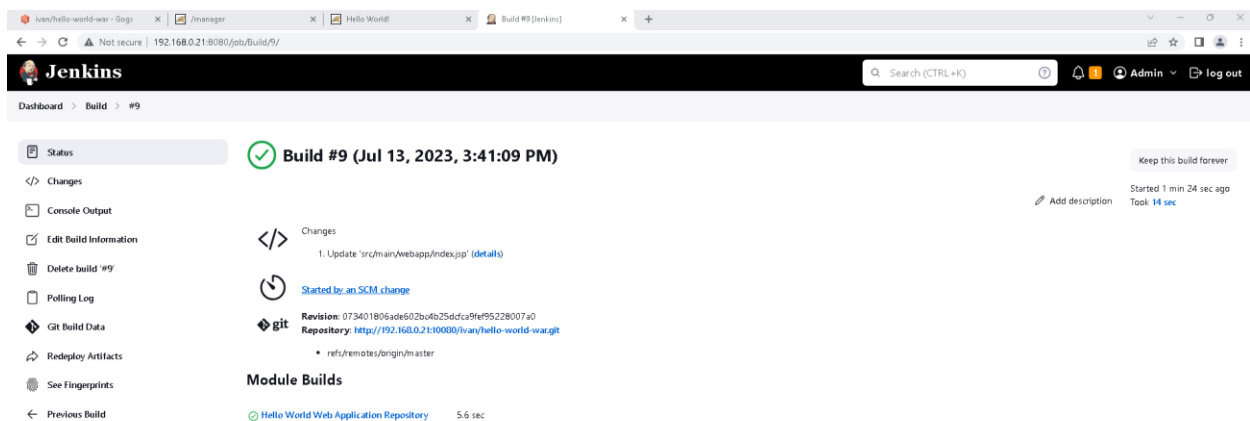
Buildovana aplikacija i ispod slika deploy na tomcat odnosno aplikacija koja je pokrenuta



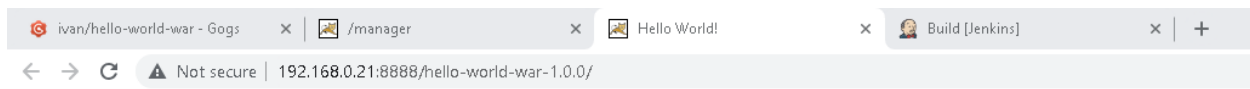
Sada mozemo da komitujemo neku promenu u repozitorijum



Npr. dodati neki novi element u HTML-u kao na slici i sacekom jenkins da pokrene build posle nekoliko minuta.



Posle toga mozemo otvoriti i novu web aplikaciju sa izmenom



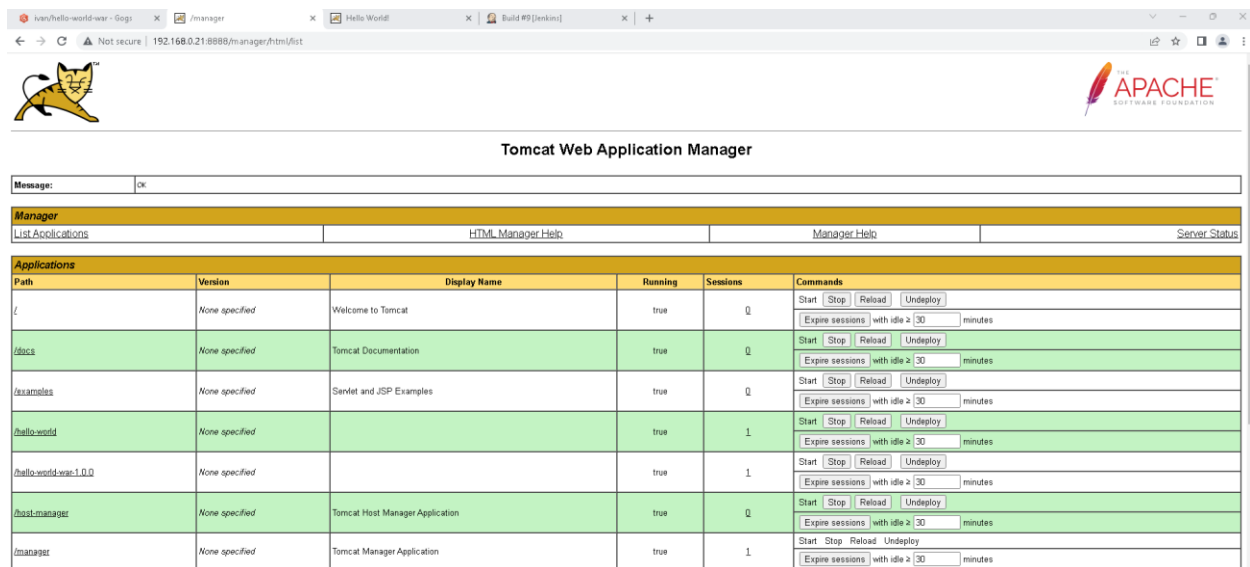
Hello World!

New build - Ivan

It is now Thu Jul 13 15:41:50 UTC 2023

You are coming from 192.168.0.11

Koju takodje mozemo videti i u tomcat manageru



5. Podesavanje Nagios servera

1. Za pokretanje Nagios servera koristimo docker kontejner manios/nagios, pullujemo kontejner pomocu sledece komande

```
docker pull manios/nagios:latest
```

2. Koristimo komandu da kopiramo konfiguracione fajlove iz kotnejnera na hostu.

```
sudo docker cp nagios:/opt/nagios/etc /storage/nagios-data
```

3. Dodamo fajl sa sadrzajem kao na slici ispod, na hostu gde planiramo da napravimo volume za nagios kontejner u ovom slucaju /storage/nagios-data/objects/docker.cfg u kome se nalaze podaci o hostovima koje je potrebno pratiti odnosno kontejnerima.

```

define host {
    use                linux-server
    host_name          jenkins
    alias              JENKINS-SERVER
    address            jenkins
}

define host {
    use                linux-server
    host_name          tomcat
    alias              TOMCAT-SERVER
    address            tomcat
}

define host {
    use                linux-server
    host_name          gogs
    alias              GOGS-SERVER
    address            gogs
}

define host {
    use                linux-server
    host_name          mysql
    alias              MYSQL-SERVER
    address            mysql
}

```

4. Dodamo putanju do prethodno kreiranog docker.cfg fajla u fajlu koji se nalazi u /storage/nagios-data/nagios.cfg kao na slici ispod

```

# Definitions for monitoring the local (Linux) host
cfg_file=/opt/nagios/etc/objects/localhost.cfg
cfg_file=/opt/nagios/etc/objects/docker.cfg

```

5. Pokrecemo kontejnere pomocu docker compose fajla.

6. Nakon toga mozemo da otvorimo nagios u borwseru na adresi 192.168.0.21:8090 kao na slici ispod gde mozemo da vidimo statuse hostova odnosno kontejnera.

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Summary

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Current Network Status

Last Updated: Fri Jul 14 11:40:35 UTC 2023

Updated every 60 seconds

Nagios Core™ 4.4.13 - www.nagios.org

Logged in as nagiosadmin

Host Status Totals

Up Down Unreachable Pending

5 0 0 0

All Problems All Types

0 5

Service Status Totals

Ok Warning Unknown Critical Pending

6 1 0 0 0

All Problems All Types

6 7

Host Status Details For All Host Groups

Limit Results: 100

Host	Status	Last Check	Duration	Status Information
gopi	UP	2023-07-14 11:38:05	0d 0h 52m 30s	FRGO OK - Packet loss = 0%, RTT = 0.23 ms
jenkins	UP	2023-07-14 11:39:04	0d 0h 51m 31s	FRGO OK - Packet loss = 0%, RTT = 0.31 ms
localhost	UP	2023-07-14 11:38:30	0d 0h 50m 40s	FRGO OK - Packet loss = 0%, RTT = 0.22 ms
mysql	UP	2023-07-14 11:38:05	0d 0h 49m 31s	FRGO OK - Packet loss = 0%, RTT = 0.21 ms
tomcat	UP	2023-07-14 11:37:04	0d 0h 48m 31s	FRGO OK - Packet loss = 0%, RTT = 0.28 ms