Vaja 2

Postavitev in upravljanje računalniških oblakov

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1 Opis naloge

CIlj naloge je bila mreža virtualnih računalnikov, ki imajo med sabo omogočeno SSH povezavo. Torej s pomočjo VirtualBox smo ustvarili gručo 10 računalnikov, na katere se lahko povežemo s protokolom SSH. Za demonstracijo delovanja smo uporabili še program *parallel-ssh*, ki omogoča pošiljanje ukaza na več gostiteljev.

2 Opis rešitve

Rešitev te naloge sem implementiral kot 2 skripti. Prva skripta, vidna v bloku 1, prikazuje del, kjer iz osnovne instance (*base box*) kreiramo 9 kloniranih. V tej osnovni instanci imamo nastavljena 2 omrežna vmesnika. Eden je NAT in omogoča dostop do svetovnega spleta, drugi pa je Host Only in omogoča povezavo med virtualkami. Skripta nato s pomočjo *vboxmanage* instance klonira, jih zažene, počaka, da se jim dodelijo IP naslovi (da je zagon popolen), in s temi ip naslovi zgradi veljaven SSH config datoteko, s pomočjo katere se kasneje povezujemo na računalnike.

V drugi skripti, prikazani v bloku 2, pa je implementirana logika za povezovanje na računalnike. Na vsako instanco se najprej kopira ssh konfiguracijska datoteka (primer je prikazan v bloku 3), nato pa se na instanco povežemo in iz nje zaženemo ukaz *parallel-ssh*. Izhod tega ukaza je prikazan v bloku 4.

Listing 1: Koda programa za generiranje klonov instance

```
#!/usr/bin/env zsh
#
# Program, ki podano virtualbox sliko kopira na doloceno stevilo instanc in si
    ↪ shrani njihove ip naslove
#
# Uporabljen pri predmetu Postavitev in upravljanje racunalniskih oblakov, 2018
#
# @author David Rubin

CLUSTER_SIZE=9 # Velikost clustra, (koiko klonov naj naredi)
BASE_BOX="ubuntu0" # Ime osnovne slike, ki jo bomo klonirali
echo -n "" > config
```

```
# Kloniraj instance (vsako poimenuj in jo registriraj v VB)
for (( i = 1; i <= CLUSTER_SIZE; i++ )); do
        vboxmanage clonevm --register --name ubuntu$i ubuntu0 #> /dev/null
        vboxmanage startvm ubuntu$i --type headless
        echo "Waiting␣for␣a␣new␣IP"
        sleep 30 # Pocakaj da masina dobi nov IP
        echo Host ubuntu$i >> config
        echo -n -e '\t'HostName'␣' >> config
        vboxmanage guestproperty get ubuntu$i "/VirtualBox/GuestInfo/Net/1/V4/
            ↪ IP" | awk '{print␣$2}' >> config
        echo "" >> config
done
echo -e 'Host␣*\n\tUser␣vagrant\n\tStrictHostKeyChecking␣no\n\tIdentityFile␣~/.
    ↪ ssh/ubuntu_id' >> config

# Prizgi se originalno instanco
vboxmanage startvm $BASE_BOX --type headless
sleep 30
echo Host $BASE_BOX >> config
echo -n -e '\t'HostName'␣' >> config
vboxmanage guestproperty get $BASE_BOX "/VirtualBox/GuestInfo/Net/1/V4/IP" |
    ↪ awk '{print␣$2}' >> config
echo "" >> config
```

Listing 2: Koda programa za povezovanje med instancami

```
#!/usr/bin/env zsh
#
# Program, ki v gruci racunalnikov poimenovanih ubuntu0-ubuntuN vzpostavi
# ssh config datoteke in se poveze na razlicne kombinacije povezav.
#
# Uporabljen pri predmetu Postavitev in upravljanje racunalniskih oblakov, 2018
#
# @author David Rubin

CLUSTER_SIZE=9

# Kopiraj ssh config na vsako izmed teh instanc in nanji izvedi parallel-ssh
for (( i = 0; i <= CLUSTER_SIZE; i++ )); do
        scp -F config config ubuntu$i:~/.ssh/config
        echo "Connecting␣to␣ubuntu"$i
        echo -e ubuntu{0..$CLUSTER_SIZE}'\n' | sed -e 's/ubuntu'$i'//g' > hosts
            ↪ .txt
        scp -F config hosts.txt ubuntu$i:~/hosts.txt
        ssh -F config ubuntu$i parallel-ssh -i -h hosts.txt hostname -I
        echo ""
done
```

Listing 3: Primer konfiguracijske datoteke

```
Host ubuntu1
        HostName 172.28.128.30

Host ubuntu2
        HostName 172.28.128.31

Host ubuntu3
        HostName 172.28.128.32

Host ubuntu4
```

```
        HostName 172.28.128.33

Host ubuntu5
        HostName 172.28.128.34

Host ubuntu6
        HostName 172.28.128.35

Host ubuntu7
        HostName 172.28.128.36

Host ubuntu8
        HostName 172.28.128.37

Host ubuntu9
        HostName 172.28.128.38

Host *
        User vagrant
        StrictHostKeyChecking no
        IdentityFile ~/.ssh/ubuntu_id

Host ubuntu0
        HostName 172.28.128.5
```

Listing 4: Prikaz delovanja programa za povezovanje

```
Connecting to ubuntu0
[1] 19:35:30 [SUCCESS] ubuntu2
10.0.2.15 172.28.128.31
[2] 19:35:30 [SUCCESS] ubuntu1
10.0.2.15 172.28.128.30
[3] 19:35:30 [SUCCESS] ubuntu3
10.0.2.15 172.28.128.32
[4] 19:35:30 [SUCCESS] ubuntu5
10.0.2.15 172.28.128.34
[5] 19:35:30 [SUCCESS] ubuntu4
10.0.2.15 172.28.128.33
[6] 19:35:30 [SUCCESS] ubuntu8
10.0.2.15 172.28.128.37
[7] 19:35:30 [SUCCESS] ubuntu9
10.0.2.15 172.28.128.38
[8] 19:35:30 [SUCCESS] ubuntu7
10.0.2.15 172.28.128.36
[9] 19:35:30 [SUCCESS] ubuntu6
10.0.2.15 172.28.128.35

Connecting to ubuntu1
[1] 19:35:32 [SUCCESS] ubuntu0
10.0.2.15 172.28.128.5
[2] 19:35:32 [SUCCESS] ubuntu3
10.0.2.15 172.28.128.32
[3] 19:35:32 [SUCCESS] ubuntu6
10.0.2.15 172.28.128.35
[4] 19:35:32 [SUCCESS] ubuntu4
10.0.2.15 172.28.128.33
[5] 19:35:32 [SUCCESS] ubuntu2
10.0.2.15 172.28.128.31
[6] 19:35:32 [SUCCESS] ubuntu7
10.0.2.15 172.28.128.36
[7] 19:35:32 [SUCCESS] ubuntu9
```

```
10.0.2.15 172.28.128.38
[8] 19:35:32 [SUCCESS] ubuntu8
10.0.2.15 172.28.128.37
[9] 19:35:32 [SUCCESS] ubuntu5
10.0.2.15 172.28.128.34

Connecting to ubuntu2
[1] 19:35:33 [SUCCESS] ubuntu5
10.0.2.15 172.28.128.34
[2] 19:35:33 [SUCCESS] ubuntu3
10.0.2.15 172.28.128.32
[3] 19:35:33 [SUCCESS] ubuntu7
10.0.2.15 172.28.128.36
[4] 19:35:33 [SUCCESS] ubuntu4
10.0.2.15 172.28.128.33
[5] 19:35:33 [SUCCESS] ubuntu1
10.0.2.15 172.28.128.30
[6] 19:35:33 [SUCCESS] ubuntu6
10.0.2.15 172.28.128.35
[7] 19:35:33 [SUCCESS] ubuntu8
10.0.2.15 172.28.128.37
[8] 19:35:33 [SUCCESS] ubuntu0
10.0.2.15 172.28.128.5
[9] 19:35:33 [SUCCESS] ubuntu9
10.0.2.15 172.28.128.38

Connecting to ubuntu3
[1] 19:35:35 [SUCCESS] ubuntu2
10.0.2.15 172.28.128.31
[2] 19:35:35 [SUCCESS] ubuntu0
10.0.2.15 172.28.128.5
[3] 19:35:35 [SUCCESS] ubuntu9
10.0.2.15 172.28.128.38
[4] 19:35:35 [SUCCESS] ubuntu6
10.0.2.15 172.28.128.35
[5] 19:35:35 [SUCCESS] ubuntu1
10.0.2.15 172.28.128.30
[6] 19:35:35 [SUCCESS] ubuntu4
10.0.2.15 172.28.128.33
[7] 19:35:35 [SUCCESS] ubuntu7
10.0.2.15 172.28.128.36
[8] 19:35:35 [SUCCESS] ubuntu8
10.0.2.15 172.28.128.37
[9] 19:35:35 [SUCCESS] ubuntu5
10.0.2.15 172.28.128.34

Connecting to ubuntu4
[1] 19:35:36 [SUCCESS] ubuntu0
10.0.2.15 172.28.128.5
[2] 19:35:36 [SUCCESS] ubuntu1
10.0.2.15 172.28.128.30
[3] 19:35:37 [SUCCESS] ubuntu5
10.0.2.15 172.28.128.34
[4] 19:35:37 [SUCCESS] ubuntu2
10.0.2.15 172.28.128.31
[5] 19:35:37 [SUCCESS] ubuntu3
10.0.2.15 172.28.128.32
[6] 19:35:37 [SUCCESS] ubuntu6
10.0.2.15 172.28.128.35
[7] 19:35:37 [SUCCESS] ubuntu7
```

```
10.0.2.15 172.28.128.36
[8] 19:35:37 [SUCCESS] ubuntu8
10.0.2.15 172.28.128.37
[9] 19:35:37 [SUCCESS] ubuntu9
10.0.2.15 172.28.128.38

Connecting to ubuntu5
[1] 19:35:38 [SUCCESS] ubuntu1
10.0.2.15 172.28.128.30
[2] 19:35:38 [SUCCESS] ubuntu0
10.0.2.15 172.28.128.5
[3] 19:35:38 [SUCCESS] ubuntu4
10.0.2.15 172.28.128.33
[4] 19:35:38 [SUCCESS] ubuntu2
10.0.2.15 172.28.128.31
[5] 19:35:38 [SUCCESS] ubuntu3
10.0.2.15 172.28.128.32
[6] 19:35:38 [SUCCESS] ubuntu9
10.0.2.15 172.28.128.38
[7] 19:35:38 [SUCCESS] ubuntu7
10.0.2.15 172.28.128.36
[8] 19:35:38 [SUCCESS] ubuntu8
10.0.2.15 172.28.128.37
[9] 19:35:38 [SUCCESS] ubuntu6
10.0.2.15 172.28.128.35

Connecting to ubuntu6
[1] 19:35:40 [SUCCESS] ubuntu1
10.0.2.15 172.28.128.30
[2] 19:35:40 [SUCCESS] ubuntu0
10.0.2.15 172.28.128.5
[3] 19:35:40 [SUCCESS] ubuntu2
10.0.2.15 172.28.128.31
[4] 19:35:40 [SUCCESS] ubuntu9
10.0.2.15 172.28.128.38
[5] 19:35:40 [SUCCESS] ubuntu5
10.0.2.15 172.28.128.34
[6] 19:35:40 [SUCCESS] ubuntu3
10.0.2.15 172.28.128.32
[7] 19:35:40 [SUCCESS] ubuntu4
10.0.2.15 172.28.128.33
[8] 19:35:40 [SUCCESS] ubuntu7
10.0.2.15 172.28.128.36
[9] 19:35:40 [SUCCESS] ubuntu8
10.0.2.15 172.28.128.37

Connecting to ubuntu7
[1] 19:35:41 [SUCCESS] ubuntu0
10.0.2.15 172.28.128.5
[2] 19:35:42 [SUCCESS] ubuntu3
10.0.2.15 172.28.128.32
[3] 19:35:42 [SUCCESS] ubuntu2
10.0.2.15 172.28.128.31
[4] 19:35:42 [SUCCESS] ubuntu1
10.0.2.15 172.28.128.30
[5] 19:35:42 [SUCCESS] ubuntu8
10.0.2.15 172.28.128.37
[6] 19:35:42 [SUCCESS] ubuntu6
10.0.2.15 172.28.128.35
[7] 19:35:42 [SUCCESS] ubuntu4
```

```
10.0.2.15 172.28.128.33
[8] 19:35:42 [SUCCESS] ubuntu5
10.0.2.15 172.28.128.34
[9] 19:35:42 [SUCCESS] ubuntu9
10.0.2.15 172.28.128.38

Connecting to ubuntu8
[1] 19:35:43 [SUCCESS] ubuntu0
10.0.2.15 172.28.128.5
[2] 19:35:43 [SUCCESS] ubuntu3
10.0.2.15 172.28.128.32
[3] 19:35:43 [SUCCESS] ubuntu1
10.0.2.15 172.28.128.30
[4] 19:35:43 [SUCCESS] ubuntu2
10.0.2.15 172.28.128.31
[5] 19:35:43 [SUCCESS] ubuntu5
10.0.2.15 172.28.128.34
[6] 19:35:43 [SUCCESS] ubuntu7
10.0.2.15 172.28.128.36
[7] 19:35:43 [SUCCESS] ubuntu9
10.0.2.15 172.28.128.38
[8] 19:35:43 [SUCCESS] ubuntu6
10.0.2.15 172.28.128.35
[9] 19:35:43 [SUCCESS] ubuntu4
10.0.2.15 172.28.128.33

Connecting to ubuntu9
[1] 19:35:45 [SUCCESS] ubuntu2
10.0.2.15 172.28.128.31
[2] 19:35:45 [SUCCESS] ubuntu1
10.0.2.15 172.28.128.30
[3] 19:35:45 [SUCCESS] ubuntu0
10.0.2.15 172.28.128.5
[4] 19:35:45 [SUCCESS] ubuntu8
10.0.2.15 172.28.128.37
[5] 19:35:45 [SUCCESS] ubuntu4
10.0.2.15 172.28.128.33
[6] 19:35:45 [SUCCESS] ubuntu5
10.0.2.15 172.28.128.34
[7] 19:35:45 [SUCCESS] ubuntu6
10.0.2.15 172.28.128.35
[8] 19:35:45 [SUCCESS] ubuntu3
10.0.2.15 172.28.128.32
[9] 19:35:45 [SUCCESS] ubuntu7
10.0.2.15 172.28.128.36
```

3 Izjava o izdelavi domače naloge

Domačo nalogo in pripadajoče programe sem izdelal sam.