

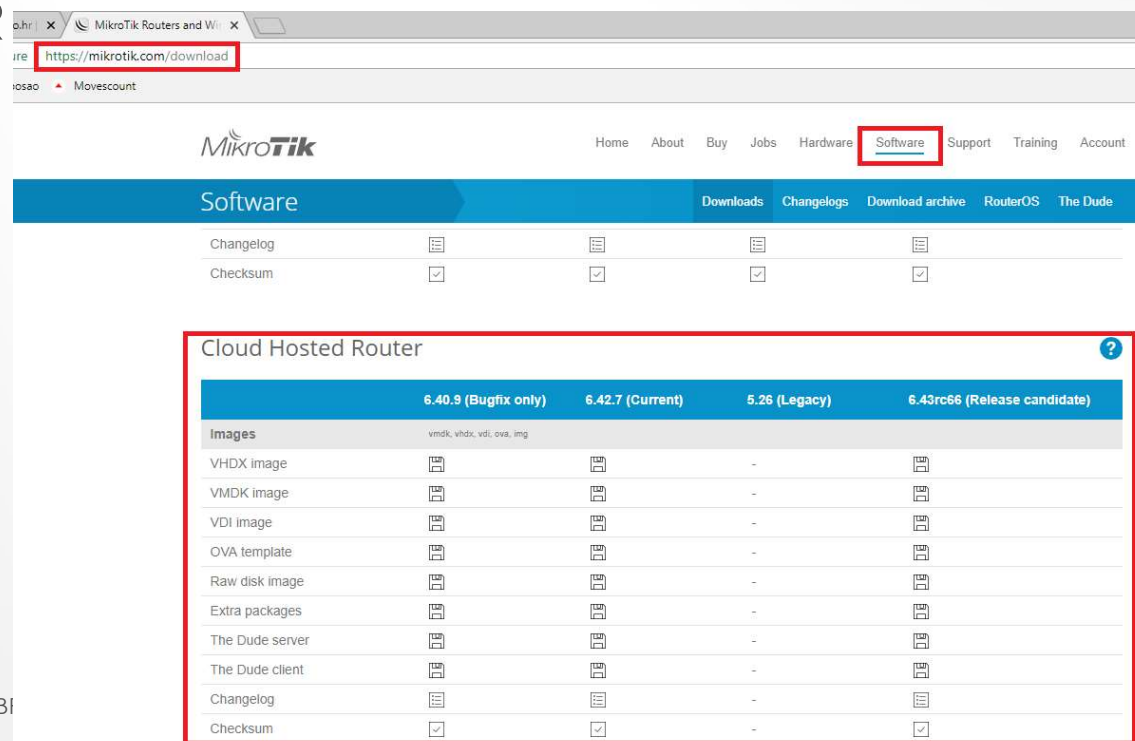
A faint, light gray world map is visible in the background of the slide, centered behind the text.

# KONFIGURIRANJE MREŽE MEĐU (VIRTUALNIM) RAČUNALIMA

Konfiguracija računalnih mreža i servisa – Vježbe  
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TŠC 2018./2019.  
v2.0

# ROUTEROS

- operacijski sustav za mikrotik uređaje
- može biti virtualiziran – CHR
  - cloud hosted router
- [www.mikrotik.com](http://www.mikrotik.com)

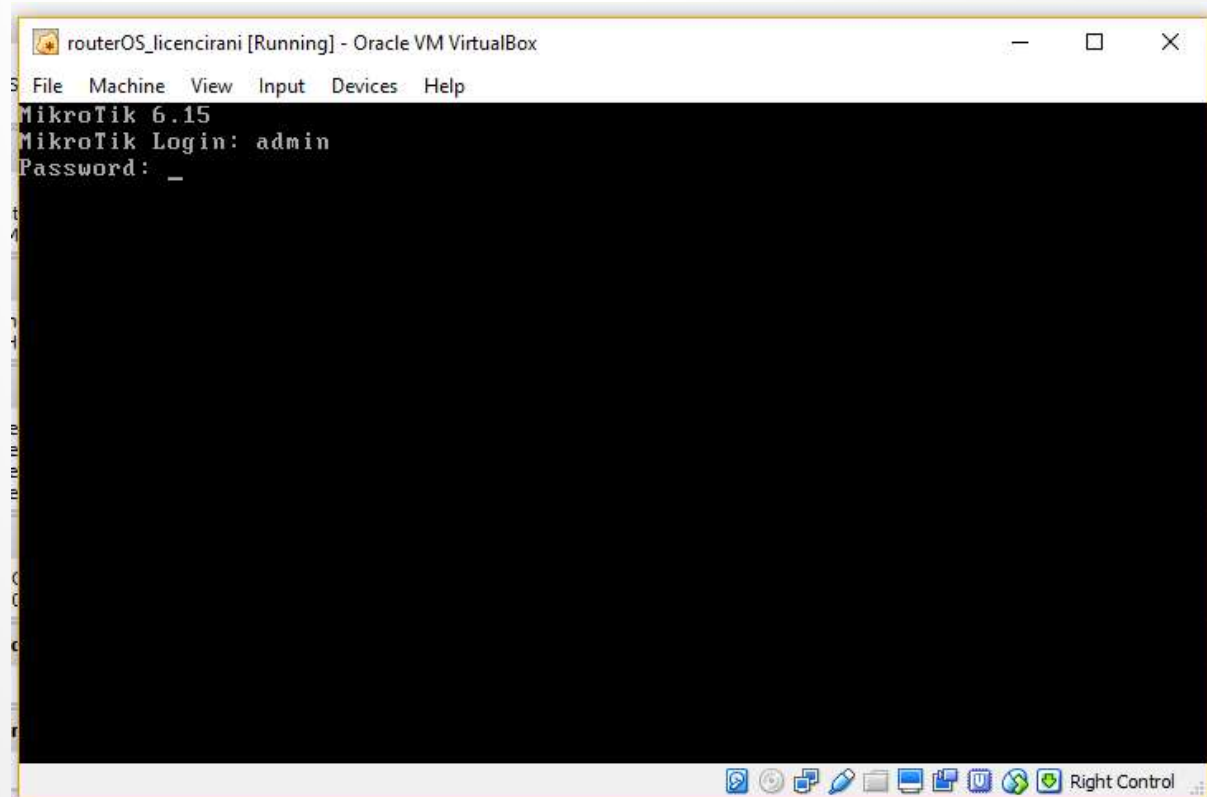


The screenshot shows the Mikrotik website's download page. The browser address bar displays <https://mikrotik.com/download>. The navigation menu includes Home, About, Buy, Jobs, Hardware, **Software**, Support, Training, and Account. The 'Software' section is active, showing a table with columns for Changelog and Checksum. Below this, the 'Cloud Hosted Router' section is highlighted with a red box. It contains a table with columns for different RouterOS versions: 6.40.9 (Bugfix only), 6.42.7 (Current), 5.26 (Legacy), and 6.43rc66 (Release candidate). The table lists various image formats (VHDX, VMDK, VDI, OVA) and provides download links for each. A 'The Dude' client link is also present. The table ends with Changelog and Checksum rows.

	6.40.9 (Bugfix only)	6.42.7 (Current)	5.26 (Legacy)	6.43rc66 (Release candidate)
<b>Images</b>				
vmdk, vhdx, vdi, ova, img				
VHDX image			-	
VMDK image			-	
VDI image			-	
OVA template			-	
Raw disk image			-	
Extra packages			-	
The Dude server			-	
The Dude client			-	
Changelog			-	
Checksum			-	

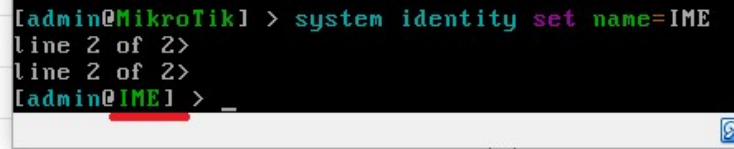
# CHR - PRISTUPANJE

- inicijalni podaci
- korisničko ime: **admin**
- lozinka: **(ništa)**
- moguće pristupiti koristit GUI
  - winbox



# CHR – POSTAVLJANJE IDENTITETA

- resetiranje svih postavki (oprez!)
  - system reset-configuration no-defaults=yes (enter) (y)
- system -> identity -> set name=ŽELJENO\_IME

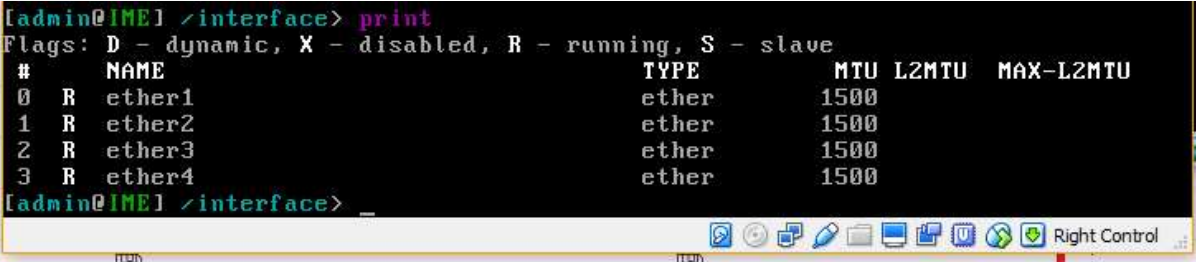


```
[admin@MikroTik] > system identity set name=IME
line 2 of 2>
line 2 of 2>
[admin@IME] > _
```

# CHR – LISTA SUČELJA

- interface print (enter)

```
[admin@IME] /interface> print
Flags: D - dynamic, X - disabled, R - running, S - slave
#  NAME      TYPE      MTU  L2MTU  MAX-L2MTU
0  R  ether1    ether     1500
1  R  ether2    ether     1500
2  R  ether3    ether     1500
3  R  ether4    ether     1500
[admin@IME] /interface> _
```



# CHR –IP ADRESE

- ispis svih IP adresa
  - ip address print

```
[admin@IME] > ip address print
Flags: X - disabled, I - invalid, D - dynamic
#   ADDRESS          NETWORK    INTERFACE
0   192.168.1.1/24    192.168.1.0    ether2
[admin@IME] > _
```

- postavljanje IP adrese
  - ip address add address=IPadresa/MreznaMaska interface=SUCELJE

```
[admin@IME] > ip address add address=192.168.66.3/24 interface=ether2 disabled=n
0
[admin@IME] > ip ad pr
Flags: X - disabled, I - invalid, D - dynamic
#   ADDRESS          NETWORK    INTERFACE
0   192.168.1.1/24    192.168.1.0    ether2
1   192.168.66.3/24   192.168.66.0   ether2
[admin@IME] > _
```

# CHR – TESTIRANJE

- ping
  - ping IP\_ADRESA
  - zaustavljanje **Ctrl+C**
- pregled „susjedstva”
  - ip neighbor print

```
[dude@baza - zld] > ping 10.0.0.2
```

SEQ	HOST	SIZE	TTL	TIME	STATUS
0	10.0.0.2	56	64	3ms	
1	10.0.0.2	56	64	3ms	
2	10.0.0.2	56	64	3ms	
3	10.0.0.2	56	64	9ms	
4	10.0.0.2	56	64	3ms	

```
sent=5 received=5 packet-loss=0% min-rtt=3ms avg-rtt=4ms max-rtt=9ms
```

```
[dude@baza - zld] > █
```

```
[dude@baza - zld] > ip neighbor print
```

#	INTERFACE	ADDRESS	MAC-ADDRESS
0	sfp.Ca...	10.250.0.2	CC:2D:E0:B9:C3:5E
1	ether2...	10.251.3.1	4C:5E:0C:8E:2F:1D
2	ether2...	10.251.3.2	4C:5E:0C:86:39:C3
3	ether3...		E4:8D:8C:7C:E5:A4
4	linkPo...	10.251.1.2	4C:5E:0C:8E:2F:1B
5	linkBr...	10.251.1.3	E4:8D:8C:7C:E5:A4
6	BRDA_CORE		E4:8D:8C:7C:E5:A5
7	BRDA_CORE	10.250.0.10	4C:5E:0C:82:0F:63
8	CHR_Mi...	172.16.17.1	

```
[dude@baza - zld] > █
```

... user dude logged in from 10.251.1.249 via sshkey

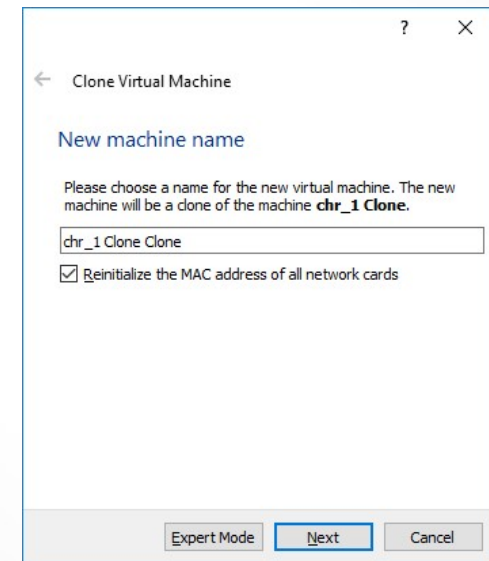
# ALATI

- virtualbox
- network adapter postavke
- VLAN tehnologija



# PONOVIMO

- što je VLAN?
- koji su zahtjevi za korištenje VLAN tehnologije?
- Ne zaboravi **reinicijalizirati** MAC adresu prilikom kloniranja



# IZRAVNO SPAJANJE – INTERNAL NETWORK

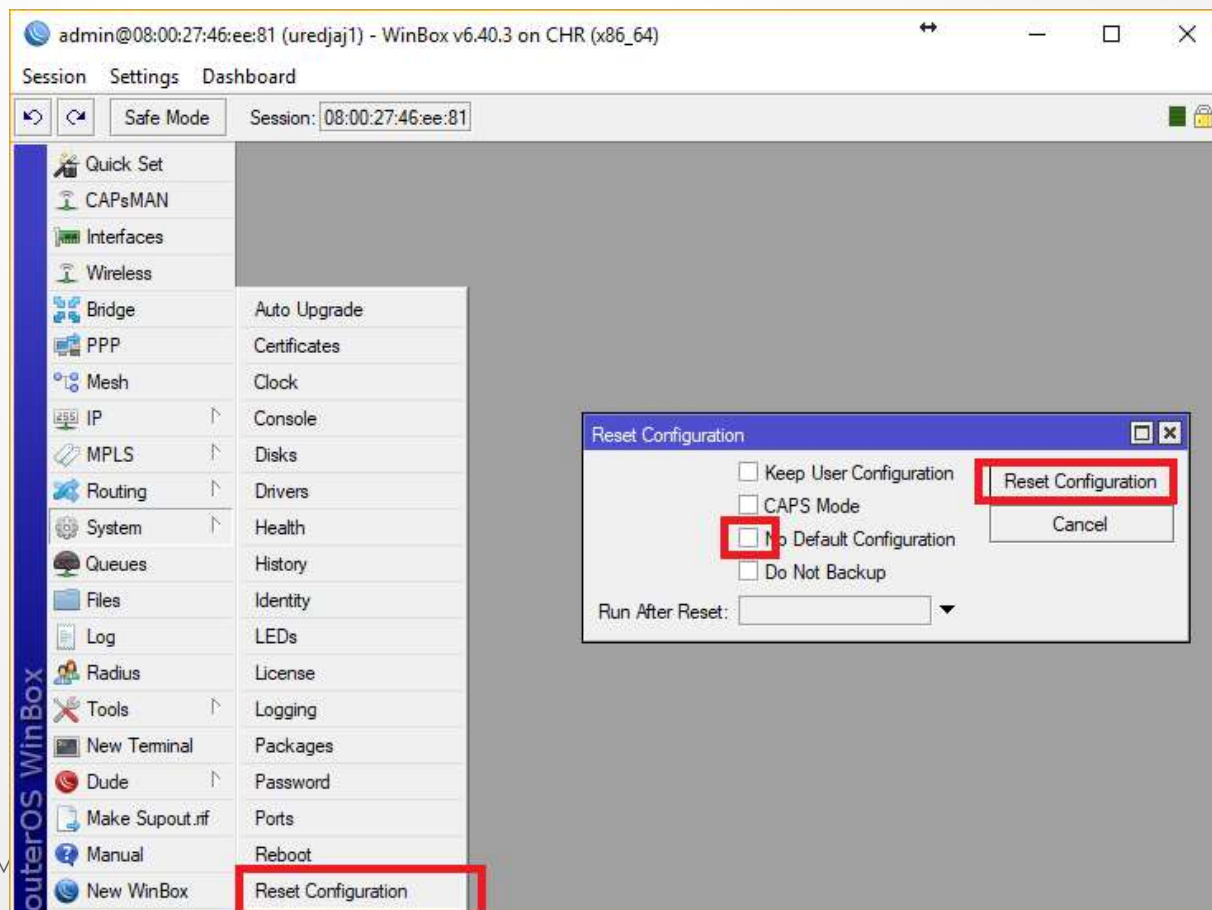
- Adapter 1 – Host-Only Adapter
- Adapter 2 – internal network
  - name: ether2
  - Advanced-> Adapter type: **Paravirtualized Network**
- pokrenuti strojeve
- prijaviti se (admin/NULL)
- upisati: interface ethernet print
- otvoriti Winbox i upisati MAC adresu ether2 adaptera
- kliknuti na connect

```
[admin@uredjaj1] > interface ethernet print
Flags: X - disabled, R - running, S - slave
#    NAME      MTU  MAC-ADDRESS      ARP
0 R  ether1     1500 08:00:27:6A:95:BE enabled
1 R  ether2     1500 08:00:27:46:EE:81 enabled
[admin@uredjaj1] > o_
```

# IZRAVNO SPAJANJE – INTERNAL NETW

- System – Reset Configuration
- Odabrati: No Default Configuration
- pričekati ponovno podizanje operativnog sistema

KONFIGURACIJA RAČUNALNIH MREŽA I SERVISA - VJEŽBE. M

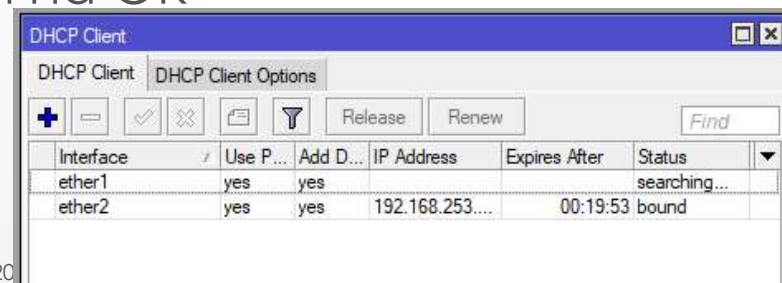


# IZRAVNO SPAJANJE

- spojiti se alatom Winbox
- odabrati System – Identity
- postaviti identitet na: uredjaj01 tj uredjaj02

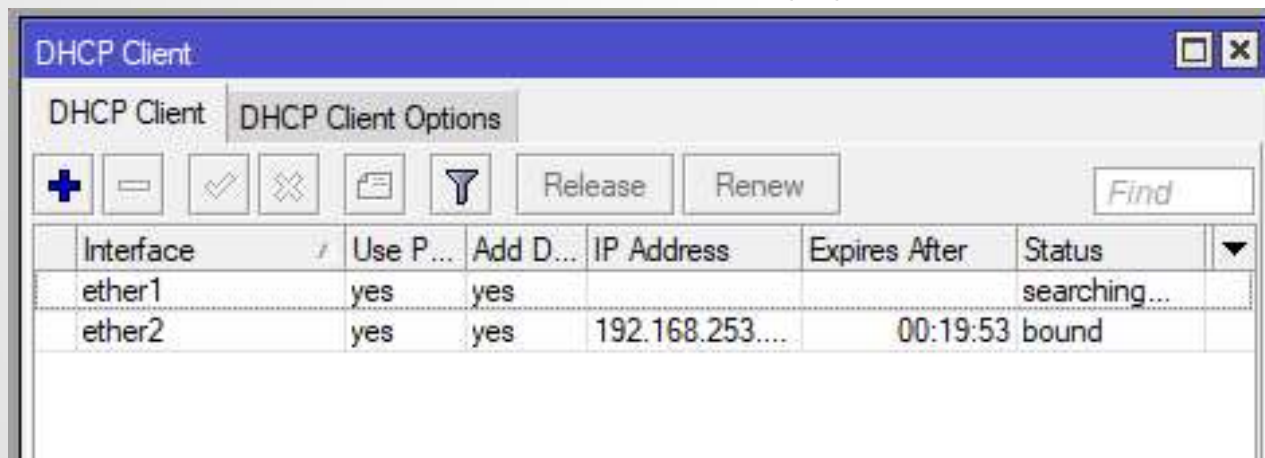
# IZRAVNO SPAJANJE

- odabrati izbornik **Interfaces**
- potrebno odrediti koje sučelje je spojeno na Host-only adapter
  - na host only adapteru je uključen DHCP poslužitelj, tako da će to sučelje dobiti IP adresu
- odabrati IP -> DHCP Client
- na kartici DHCP Client odabrati plavi plus
- odabrati sučelje ether1 te kliknuti na OK
- ponoviti korake za ether2



# IZRAVNO SPAJANJE

- sučelje koje *dobilo* IP adresu je spojeno na Host-Only adapter
- sučelje koje **nije dobilo** IP adresu je naša **internal network**
- u donjem primjeru, sučelje ether1 je spojeno na internal network, te od sada radimo *na njoj*

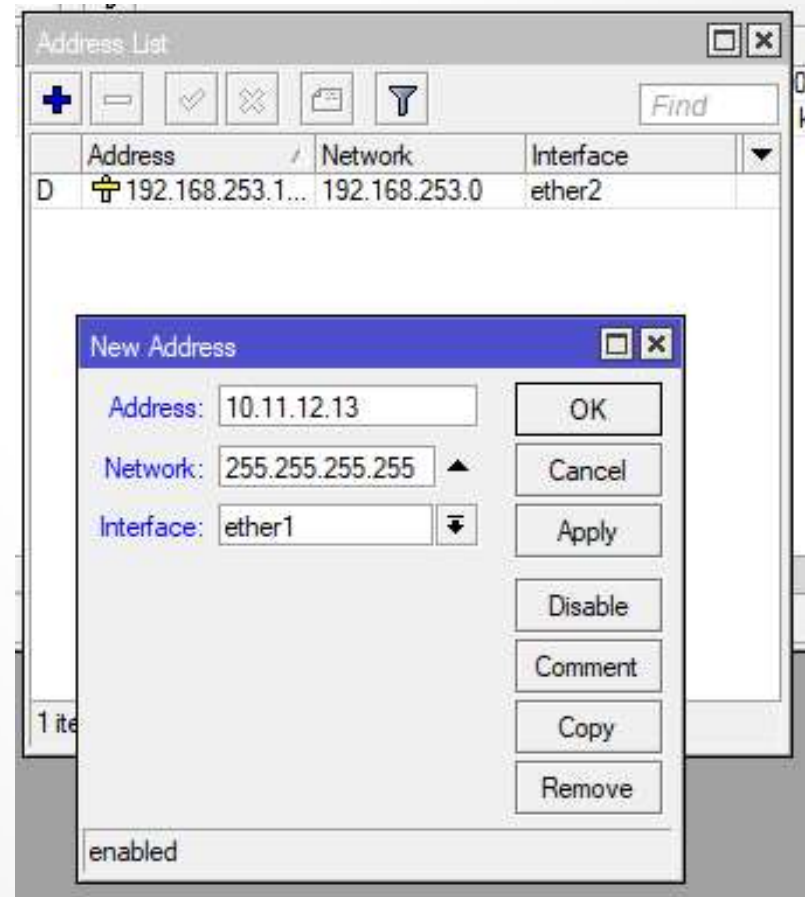


# IZRAVNO SPAJANJE

- zadatak: dodati mrežne postavke (ip adresu, mrežnu masku) sučeljima **internal network** tako da uređaji mogu izravno komunicirati
- na uređaju1 etherX ima IP adresu: \_\_\_\_\_ A  
na uređaju1 etherX ima mrežnu masku: \_\_\_\_\_ B
- na uređaju2 etherX ima IP adresu: \_\_\_\_\_ C  
na uređaju2 etherX ima mrežnu masku: \_\_\_\_\_ D

# IZRAVNO SPAJANJE

- IP -> Addresses
- odabrati plavi plus
- uređaj1
  - Address: A ( \_\_\_\_\_ )
  - Network: B ( \_\_\_\_\_ )
  - Interface: etherX ( \_\_\_\_\_ )
- uređaj2
  - Address: A ( \_\_\_\_\_ )
  - Network: B ( \_\_\_\_\_ )
  - Interface: etherX ( \_\_\_\_\_ )





# IZRAVNO POVEZIVANJE

- isprobaj na uređaju 1 dostupnost uređaja 2
- tools – ping
- Ping to: ip adresa C (npr 10.11.12.13) (bez mrežne maske!)

Ping (Running)

General Advanced

Ping To: 192.168.253.1

Interface: [dropdown]

☐ ARP Ping

Packet Count: [dropdown]

Timeout: 1000 ms

Start Stop Close New Window

Seq #	Host	Time	Reply Size	TTL	Status
0	192.168.253.1	0ms	50	128	
1	192.168.253.1	0ms	50	128	
2	192.168.253.1	0ms	50	128	
3	192.168.253.1	0ms	50	128	
4	192.168.253.1	0ms	50	128	
5	192.168.253.1	0ms	50	128	
6	192.168.253.1	0ms	50	128	

7 items 7 of 7 packets received 0% packet loss Min: 0 ms Avg: 0 ms Max: 0 ms

# ZADATAK

- kreiraj novi virtualni stroj: krmis\_03A\_WINkljent01
  - krmis -> kratica predmeta, 03 -> tjedan, A->grupa, WINkljent01->prvi windows kljent
- omogući mu komunikaciju (ping) s **uredjaj1** i **uredjaj2**
- postupak napiši i u bilježnicu!