



universidade de aveiro
theoria poiesis praxis

**DEPARTAMENTO DE ELECTRÓNICA, TELECOMUNICAÇÕES E INFORMÁTICA
LICENCIATURA EM ENG. DE COMPUTADORES E INFORMÁTICA**

REDES DE COMUNICAÇÃO I

LABORATORY GUIDE NO. 4

NAT/PAT, DHCP AND IPV6 BASICS

Objectives

- Study of the NAT/PAT mechanisms.
- Study of DHCP.
- Study of IPv6

Duration

2 weeks

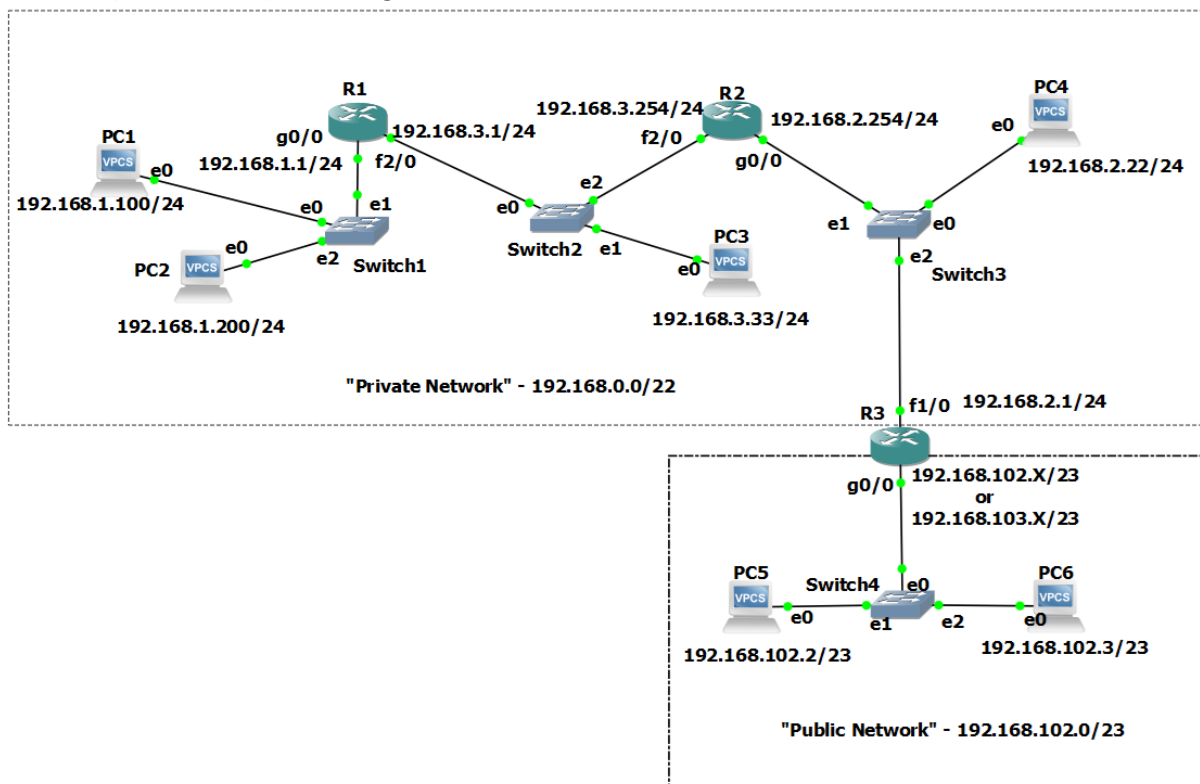
In the end of the class, send your report to your Professor.

Part 1 – NAT/PAT

1. Dynamic NAT

1.1. Base Network configuration

Assemble and configure (using the GNS3 and VPCS hosts) the network depicted in the following figure which represents a small company network (this network is based on the network from Guide 2). The company decided to configure IP private addressing using the network 192.168.0.0/22 and NAT mechanism (without PAT) to manage all Internet accesses.



- a) Create default routes on R1 and R2 towards the “Public Network”

R1:
 R1# **configure terminal** // conf t
 R1(config)# **ip route 0.0.0.0 0.0.0.0 192.168.3.254**

R2:
 R2# **configure terminal** // conf t
 R2(config)# **ip route 0.0.0.0 0.0.0.0 192.168.2.1**

- b) Configure R3 network interfaces (please refer to the annex to get the g0/0 IP address corresponding to your ID –“X” value) and routing for the internal networks.

R3:
 R3# **configure terminal** // conf t
 R3(config)# **int g0/0**
 R3(config-if)# **ip address 192.168.102/3.X 255.255.255.0** // Refer to the annex
 R3(config-if)# **no shut**
 R3(config)# **int f1/0**
 R3(config-if)# **ip address 192.168.2.1 255.255.255.0**
 R3(config-if)# **no shut**
 R3(config-if)# **exit**
 R3(config)# **ip route 192.168.0.0 255.255.255.0 192.168.2.254** // R2 is the GW to the inside

- c) Configure VPCs 5 and 6 with the corresponding IP addresses (do not configure gateway).

1.2. Dynamic NAT configuration

In order to define a pool of global addresses to be allocated by the dynamic NAT process, issue the following command on Router 3 (refer to the annex for the value of “Y”):

```
R3:
R3# configure terminal // conf t
R3(config)# ip nat pool MYNATPOOL 192.168.102/3.Y 192.168.102/3.Y netmask 255.255.255.0
```

This command defines a pool with a single public address (192.168.102/3.Y).

The name **MYNATPOOL** is the name of the address pool. The first **192.168.102/3.Y** in the command is the first IP address in the pool, and the second **192.168.102/3.Y** is the last IP address in the pool (this command creates a pool that contains only a single address, since the first and the last value have the same IP address).

Next, configure a standard **access list** to define which internal source addresses can be translated. Since any users on the private network are being translated, use the following command:

```
R3(config)# access-list 2 permit 192.168.0.0 0.0.3.255
```

This command defines that the networks 192.168.0.0/24, 192.168.1.0/24, 192.168.2.0/24 and 192.168.3.0/24 will be allowed (permitted) on the NAT process.

Finally, to establish the dynamic NAT translation, it is necessary to link the access list to the name of the NAT pool, as follows:

```
R3(config)# ip nat inside source list 2 pool MYNATPOOL
```

Note that “source list 2” refers to the “access-list 2” created before, and “pool MYNATPOOL” refers to the “nat pool” created before (be careful to guarantee that the names are exactly the same)

Finally, specify **an interface on the Router to be used by inside network hosts** requiring address translation:

```
R3(config)# interface f1/0
R3(config-if)# ip nat inside
```

Also, specify **an interface to be used as the outside NAT interface** as follows:

```
R3(config)# interface g0/0
R3(config-if)# ip nat outside
```

NOTE: If you are using different router interfaces, please adapt the commands to match the interfaces you are using.

- 1.2.1. Start a packet capture on the public network (between R3 g0/0 and Switch4) and another on the private network (between R3 f1/0 and Switch3). At PC1 execute a ping to PC5 (192.168.102.2), and on PC2 execute a ping also to PC5 (192.168.102.2). Verify (on the router) the active NAT translations and NAT activity statistics, use the commands

```
R3# show ip nat translations  
R3# show ip nat statistics
```

>> Which packets had the source IP addresses translated? Explain the obtained results.

- 1.2.2. Execute on the router the command to clear the NAT translation table:

```
R3# clear ip nat translation *
```

and execute again a ping at PC2 to **192.168.102.3**

>> Explain the observed results.

- 1.2.3. Change NAT timeout to 60 seconds and clear the NAT translations table:

```
R3(config)# ip nat translation timeout 60  
R3# clear ip nat translation *
```

At PC1 execute a ping to **192.168.102.2**, and immediately after, at PC2 execute repeatedly a ping to **192.168.102.2**. How much time does it take to obtain connectivity between PC2 and host **192.168.102.2**?

>> Explain the observed results.

- 1.2.4. Restore NAT timeout value to 86400 seconds (24 hours):

```
R3(config)# ip nat translation timeout 86400
```

1.3. Dynamic NAT/PAT

- 1.3.1. The most powerful feature of NAT is **address overloading, or port address translation (PAT)**. Overloading allows multiple inside addresses to map to a single global address. With PAT, the NAT router keeps track of the different conversations by mapping TCP and UDP port numbers. After defining the pool of global addresses to be allocated by the dynamic NAT process and configuring the standard access list that defines which internal source addresses can be translated, configure address overloading on Router with the following command:

```
R3(config)# ip nat inside source list 2 pool MYNATPOOL overload
```

Note: You may have to reset the active NAT translations with **clear ip nat translation ***

Repeat experience 1.2.1.

>>Which are the advantages of using NAT and PAT mechanisms?

- 1.3.2. From PC1 (and PC2) try to establish UDP and TCP connections (ports 80 and 22) to the host 192.168.102.2:

PC> ping 192.168.102.2 -2 -p 80	! UDP port 80
PC> ping 192.168.102.2 -2 -p 22	! UDP port 22
PC> ping 192.168.102.2 -3 -p 80	! TCP port 80
PC> ping 192.168.102.2 -3 -p 22	! TCP port 22

Note: The option -p must have a space after (before the port number).

>> Verify (on the router) the active NAT translations and NAT activity statistics. Explain the obtained results.

1.4. Static NAT/PAT Translations

1.4.1. Try to ping the private network machines (PC1, 2, 3 or 4 or router interfaces) from PC5 or PC6.

>> Explain the results.

1.4.1. Suppose that now you have another public IP address available (address W on the annex). Configure the router in order to allow the PC5 or 6 to access PC1.

A static translation between the inside local address of a host and one of the inside global addresses can be created using the following commands:

```
R3(config)# ip nat inside source static 192.168.1.100 192.168.102/3.W
```

From PC5, ping PC1's static public address (192.168.102/3.W)

```
PC5> ping 192.168.102/3.W
```

>> Analyze the captured packets on the private network and explain the obtained results.

>> Discuss a scenario where static NAT/PAT is required.

Part 2 - DHCP

2. DHCP

2.1. DHCP server on a Cisco Router.

- 2.1.1. Configure Router 1 (R1) as DHCP server for the private network. Assume that you want to dynamically assign addresses from the range 192.168.1.101 to 192.168.1.199

```
R1(config)# service dhcp
R1(config)# ip dhcp excluded-address 192.168.1.1 192.168.1.100
R1(config)# ip dhcp excluded-address 192.168.1.200 192.168.1.254
R1(config)# ip dhcp pool 1
R1(dhcp-config)# network 192.168.1.0 255.255.255.0
R1(dhcp-config)# default-router 192.168.1.1
```

Use the following commands to verify the configuration and status of the DHCP server:

```
R1# show ip dhcp pool
R1# show ip dhcp server statistics
R1# show ip dhcp binding
```

2.2. Start a capture on Router 1's G0/0 interface.

Configure PC1 to acquire the IPv4 address dynamically:

```
PC1> ip dhcp
```

Configure PC1 to renew the IPv4 address dynamically:

```
PC1> ip dhcp -r
```

Configure PC1 to release the IPv4 address dynamically:

```
PC1> ip dhcp -x
```

Configure PC1 to acquire again the IPv4 address dynamically:

```
PC1> ip dhcp
```

Note: you may need to reset PC1 IP address. (remove and save configuration without IP)

>> In each step, analyze the exchanged DHCP packets and the contents of the DHCP Bindings at Router 1.

At this point, you may configure DHCP Pools on R1 for the remaining networks on the private part. On R2, interface g0/0, you will need to add the command **"ip helper-address 192.168.3.1"** and provide the general **service dhcp** command

Part 3 – Ipv6

(to be completed)

ANNEX A – List of IP Addresses to be used by each student.

Mec Num	Name	"Public GW Address" (X)			"NAT Pool Address" (Y)			"NAT Fixed Address" (W)		
60727	TIAGO JOÃO PEREIRA GOMES	192.168.	102	. 4	192.168.	102	. 5	192.168.	102	. 6
72476	MARIA LUISA RODRIGUES DA SILVEIRA LEITE	192.168.	102	. 8	192.168.	102	. 9	192.168.	102	. 10
77129	ANDRADE ANTÓNIO FRANCISCO	192.168.	102	. 12	192.168.	102	. 13	192.168.	102	. 14
79319	SIMONE RAQUEL NOVO PASCOAL	192.168.	102	. 16	192.168.	102	. 17	192.168.	102	. 18
96661	NICOLE MONTEIRO RAKOV	192.168.	102	. 20	192.168.	102	. 21	192.168.	102	. 22
97288	RÚBEN JORGE ESPÍRITO SANTO PEREIRA	192.168.	102	. 24	192.168.	102	. 25	192.168.	102	. 26
102394	ISABEL MARIA CASACA DA SILVA	192.168.	102	. 28	192.168.	102	. 29	192.168.	102	. 30
103583	JUAN SEBASTIAN PEREIRA CARPINTERO	192.168.	102	. 32	192.168.	102	. 33	192.168.	102	. 34
107987	GABRIEL ESTÊVÃO SAL MONTEIRO	192.168.	102	. 36	192.168.	102	. 37	192.168.	102	. 38
108154	TOMÁS CORREIA DE SÁ DOS SANTOS ALVES	192.168.	102	. 40	192.168.	102	. 41	192.168.	102	. 42
110509	RUI PEREIRA DE MELO SILVA DE ALBUQUERQUE	192.168.	102	. 44	192.168.	102	. 45	192.168.	102	. 46
112771	GONÇALO MARIA MOREIRA MENDES OLIVEIRA DA MOTA	192.168.	102	. 48	192.168.	102	. 49	192.168.	102	. 50
114251	RÚBEN MIGUEL ALMEIDA COELHO	192.168.	102	. 52	192.168.	102	. 53	192.168.	102	. 54
114292	DIOGO CAPÃO GRANGEIA	192.168.	102	. 56	192.168.	102	. 57	192.168.	102	. 58
114557	GUSTAVO GUEDES GARCIA	192.168.	102	. 56	192.168.	102	. 57	192.168.	102	. 58
114982	MARCOS MATOS KOUFALIOS	192.168.	102	. 60	192.168.	102	. 61	192.168.	102	. 62
115876	GUILHERME DA COSTA GRAÇA	192.168.	102	. 64	192.168.	102	. 65	192.168.	102	. 66
115879	JOAO PEDRO RAMOS VITORIA DA SILVA	192.168.	102	. 68	192.168.	102	. 69	192.168.	102	. 70
116113	TIAGO RAFAEL CANDEIAS PEDROSA	192.168.	102	. 72	192.168.	102	. 73	192.168.	102	. 74
117592	RUBÉM MAMBO GARCIA ANDRÉ	192.168.	102	. 76	192.168.	102	. 77	192.168.	102	. 78
118621	MATHEUS CONCEIÇÃO PINTO	192.168.	102	. 80	192.168.	102	. 81	192.168.	102	. 82
118643	JOÃO ANTÓNIO HENRIQUES VIEIRA	192.168.	102	. 84	192.168.	102	. 85	192.168.	102	. 86
118648	GUILHERME ALVES ESCÓRCIO	192.168.	102	. 88	192.168.	102	. 89	192.168.	102	. 90
118683	TIAGO PEREIRA CARVALHO DOS SANTOS PREGUIÇA	192.168.	102	. 92	192.168.	102	. 93	192.168.	102	. 94
118781	PEDRO MIGUEL DA SILVA CORADO	192.168.	102	. 96	192.168.	102	. 97	192.168.	102	. 98
118799	DANIEL BOIAN ZAMURCA	192.168.	102	. 100	192.168.	102	. 101	192.168.	102	. 102
119012	HUGO AFONSO DE TAVARES LOPES	192.168.	102	. 104	192.168.	102	. 105	192.168.	102	. 106
119187	MIGUEL CASTANHEIRA FERNANDES	192.168.	102	. 108	192.168.	102	. 109	192.168.	102	. 110
119241	ANDRÉ DIAS CORREIA	192.168.	102	. 112	192.168.	102	. 113	192.168.	102	. 114
119527	RODRIGO CONROY NUNES	192.168.	102	. 116	192.168.	102	. 117	192.168.	102	. 118
119583	ALEXANDRE OLIVEIRA SILVA	192.168.	102	. 120	192.168.	102	. 121	192.168.	102	. 122
119649	MIGUEL MAGALHAES SANTOS	192.168.	102	. 124	192.168.	102	. 125	192.168.	102	. 126
119744	NICOLAS BOTELHO DE SOUSA	192.168.	102	. 128	192.168.	102	. 129	192.168.	102	. 130
119832	VASCO PEIXOTO ARAÚJO	192.168.	102	. 132	192.168.	102	. 133	192.168.	102	. 134
119844	JOANA CASTRO E SILVA	192.168.	102	. 136	192.168.	102	. 137	192.168.	102	. 138
119859	JOÃO PEREIRA LEITE	192.168.	102	. 140	192.168.	102	. 141	192.168.	102	. 142
119871	ALEXANDRE RAFAEL DE ALMEIDA PEREIRA	192.168.	102	. 144	192.168.	102	. 145	192.168.	102	. 146
119928	MADALENA MESQUITA CEREJEIRA AMARO DIOGO	192.168.	102	. 148	192.168.	102	. 149	192.168.	102	. 150
120009	JOSÉ RAFAEL MATEUS COELHO	192.168.	102	. 152	192.168.	102	. 153	192.168.	102	. 154
120120	LUCAS PIRES ROCHINHA	192.168.	102	. 156	192.168.	102	. 157	192.168.	102	. 158
120124	PEDRO FRANCISCO DIAS TAVARES	192.168.	102	. 160	192.168.	102	. 161	192.168.	102	. 162
120172	JOÃO PEDRO DIAS DA SILVA	192.168.	102	. 164	192.168.	102	. 165	192.168.	102	. 166
120173	JOÃO MIGUEL TAVARES MARQUES	192.168.	102	. 168	192.168.	102	. 169	192.168.	102	. 170
120284	JOÃO DIOGO DA SILVA CORREIA TEIXEIRA MARTINS	192.168.	102	. 172	192.168.	102	. 173	192.168.	102	. 174
120300	ÂNGELO MANUEL CAUCHIE FIGUEIREDO	192.168.	102	. 176	192.168.	102	. 177	192.168.	102	. 178
120353	VIACHESLAV SEREDA	192.168.	102	. 180	192.168.	102	. 181	192.168.	102	. 182
120383	PEDRO NUNO DE PINA BARBEDO MONTEIRO	192.168.	102	. 184	192.168.	102	. 185	192.168.	102	. 186
120393	EDUARDO MORENO	192.168.	102	. 188	192.168.	102	. 189	192.168.	102	. 190
120958	GONÇALO AZEVEDO MOREIRA	192.168.	102	. 192	192.168.	102	. 193	192.168.	102	. 194

Mec Num	Name	"Public GW Address" (X)			"NAT Pool Address" (Y)			"NAT Fixed Address" (W)		
121728	JOÃO MOISÉS KUTAYA	192.168.	102	. 196	192.168.	102	. 197	192.168.	102	. 198
122892	LAURA MORAES TAKIGAMI GARCIA	192.168.	102	. 200	192.168.	102	. 201	192.168.	102	. 202
122895	JOSUÉ KAHUÃ GOMES DOS SANTOS	192.168.	102	. 204	192.168.	102	. 205	192.168.	102	. 206
123430	SANJAY THARU	192.168.	102	. 208	192.168.	102	. 209	192.168.	102	. 210
123433	FERNANDA ISABEL DO NASCIMENTO FLORIANO	192.168.	102	. 212	192.168.	102	. 213	192.168.	102	. 214
124686	RODRIGO MIGUEL CRUZ ANDRADE	192.168.	102	. 216	192.168.	102	. 217	192.168.	102	. 218
124693	DAVIDE DOS SANTOS SILVA	192.168.	102	. 220	192.168.	102	. 221	192.168.	102	. 222
124750	RODRIGO EDUARDO NEVES GONÇALVES	192.168.	102	. 224	192.168.	102	. 225	192.168.	102	. 226
124765	ANDRÉ HILÁRIO BRAZ	192.168.	102	. 228	192.168.	102	. 229	192.168.	102	. 230
124779	DANIEL FERREIRA CARVALHO	192.168.	102	. 232	192.168.	102	. 233	192.168.	102	. 234
124788	ANTÓNIO BERNARDO NUNES DE LIMA	192.168.	102	. 236	192.168.	102	. 237	192.168.	102	. 238
124823	LEONARDO GOMES DA SILVA	192.168.	102	. 240	192.168.	102	. 241	192.168.	102	. 242
124896	ANDRÉ FILIPE VIEIRA BRANDÃO	192.168.	102	. 244	192.168.	102	. 245	192.168.	102	. 246
124917	DUARTE ALMEIDA PEREIRA COELHO	192.168.	102	. 248	192.168.	102	. 249	192.168.	102	. 250
124921	NELSON ROCHA RAMOS	192.168.	102	. 252	192.168.	102	. 253	192.168.	102	. 254
124926	SANTIAGO RODRIGUES DOS SANTOS	192.168.	103	. 4	192.168.	103	. 5	192.168.	103	. 6
124972	SAMUEL LUCAS ROCHA RAMOS	192.168.	103	. 8	192.168.	103	. 9	192.168.	103	. 10
125016	LUIS CARLOS DE CASTRO OLIVEIRA	192.168.	103	. 12	192.168.	103	. 13	192.168.	103	. 14
125039	GUILHERME COIMBRA ANTUNES	192.168.	103	. 16	192.168.	103	. 17	192.168.	103	. 18
125050	TOMAS CARDOSO E PINTO	192.168.	103	. 20	192.168.	103	. 21	192.168.	103	. 22
125087	HENRIQUE PAESE TARDELLI	192.168.	103	. 24	192.168.	103	. 25	192.168.	103	. 26
125122	MARTIM BATISTA LEITNER	192.168.	103	. 28	192.168.	103	. 29	192.168.	103	. 30
125160	VICENTE AMORIM SILVA	192.168.	103	. 32	192.168.	103	. 33	192.168.	103	. 34
125171	RODRIGO MIGUEL CASTRO E SILVA	192.168.	103	. 36	192.168.	103	. 37	192.168.	103	. 38
125193	BRUNO FILIPE OLIVEIRA GONÇALVES	192.168.	103	. 40	192.168.	103	. 41	192.168.	103	. 42
125214	FRANCISCO RICARDO SALAZAR E SILVA	192.168.	103	. 44	192.168.	103	. 45	192.168.	103	. 46
125270	PEDRO JORGE LOPES RAMOS	192.168.	103	. 48	192.168.	103	. 49	192.168.	103	. 50
125293	RICARDO FRANCISCO ASSEMBLEIA FRANCISCO	192.168.	103	. 52	192.168.	103	. 53	192.168.	103	. 54
125302	JOÃO MANUEL SOARES PEREIRA	192.168.	103	. 56	192.168.	103	. 57	192.168.	103	. 58
125305	ANA MARGARIDA DUARTE REIS	192.168.	103	. 60	192.168.	103	. 61	192.168.	103	. 62
125413	LARA RODRIGUES MARQUES	192.168.	103	. 64	192.168.	103	. 65	192.168.	103	. 66
125442	AFONSO ALMEIDA CRUZ	192.168.	103	. 68	192.168.	103	. 69	192.168.	103	. 70
125518	GONÇALO DE PINHO SOUSA	192.168.	103	. 72	192.168.	103	. 73	192.168.	103	. 74
125527	GUILHERME TAVARES OLIVEIRA	192.168.	103	. 76	192.168.	103	. 77	192.168.	103	. 78
125549	JOÃO SINARÉ TORRES DE OLIVEIRA	192.168.	103	. 80	192.168.	103	. 81	192.168.	103	. 82
125636	GUILHERME VIVEIROS COSTA	192.168.	103	. 84	192.168.	103	. 85	192.168.	103	. 86
125718	FÁBIO EMANUEL MOREIRA RENDA	192.168.	103	. 88	192.168.	103	. 89	192.168.	103	. 90
125738	INES VEIGAS CARDOSO	192.168.	103	. 92	192.168.	103	. 93	192.168.	103	. 94
125761	AFONSO PINTO CORREIA COELHO	192.168.	103	. 96	192.168.	103	. 97	192.168.	103	. 98
125804	DINIS FILIPE DA SILVA NÉRI MARQUES CARVALHO	192.168.	103	. 100	192.168.	103	. 101	192.168.	103	. 102
125828	LOURENÇO GOMES SECO	192.168.	103	. 104	192.168.	103	. 105	192.168.	103	. 106
125836	PEDRO MIGUEL ALMEIDA BELEZA	192.168.	103	. 108	192.168.	103	. 109	192.168.	103	. 110
125855	JOÃO GABRIEL DA SILVA ROCHA	192.168.	103	. 112	192.168.	103	. 113	192.168.	103	. 114
125982	LUCAS GASPAR MARQUES	192.168.	103	. 116	192.168.	103	. 117	192.168.	103	. 118
125986	EDUARDO CONSTANTINO VAZ ALVES	192.168.	103	. 120	192.168.	103	. 121	192.168.	103	. 122
125996	TIAGO FILIPE ALMEIDA TRUTA	192.168.	103	. 124	192.168.	103	. 125	192.168.	103	. 126
126008	FILIPE SEQUEIRA CARDOSO GOMES	192.168.	103	. 128	192.168.	103	. 129	192.168.	103	. 130
126011	MARGARIDA DA SILVA TEIXEIRA	192.168.	103	. 132	192.168.	103	. 133	192.168.	103	. 134
126033	GUSTAVO NOVAIS RODRIGUES	192.168.	103	. 136	192.168.	103	. 137	192.168.	103	. 138
126036	DINIS PEDRO MONTEIRO	192.168.	103	. 140	192.168.	103	. 141	192.168.	103	. 142
126124	RODRIGO BARBOSA FIGUEIREDO	192.168.	103	. 144	192.168.	103	. 145	192.168.	103	. 146

Mec Num	Name	"Public GW Address" (X)			"NAT Pool Address" (Y)			"NAT Fixed Address" (W)		
126132	MARTIM JESUS PEREIRA DE ALMEIDA	192.168.	103	. 148	192.168.	103	. 149	192.168.	103	. 150
126154	MARCO ANTÓNIO CRUZ FLOR	192.168.	103	. 152	192.168.	103	. 153	192.168.	103	. 154
126164	FELIPE DE OLIVEIRA SILVA ROCHA	192.168.	103	. 156	192.168.	103	. 157	192.168.	103	. 158
126180	GABRIEL EDUARDO DE JÉSUS TARACHE GUZMÁN	192.168.	103	. 160	192.168.	103	. 161	192.168.	103	. 162
126193	EDGAR SIMÃO NOVO PASCOAL	192.168.	103	. 164	192.168.	103	. 165	192.168.	103	. 166
126209	LUÍS RODRIGO DA SILVA LOPES	192.168.	103	. 168	192.168.	103	. 169	192.168.	103	. 170
126252	RODRIGO CARREIRA DA SILVA	192.168.	103	. 172	192.168.	103	. 173	192.168.	103	. 174
126253	PEDRO SANTOS TAVARES	192.168.	103	. 176	192.168.	103	. 177	192.168.	103	. 178
126265	SAMUEL JOSÉ MÓNICA CARVALHAIS	192.168.	103	. 180	192.168.	103	. 181	192.168.	103	. 182
126290	ELIANA HUANG	192.168.	103	. 184	192.168.	103	. 185	192.168.	103	. 186
126392	DIOGO PAIVA VEIGA	192.168.	103	. 188	192.168.	103	. 189	192.168.	103	. 190
126418	CÊSAR GONÇALVES CARVALHO	192.168.	103	. 192	192.168.	103	. 193	192.168.	103	. 194
126421	MANUEL AGUIAR CAMPOS CARDOSO DA SILVA	192.168.	103	. 196	192.168.	103	. 197	192.168.	103	. 198
126426	GONÇALO COSTA SILVA	192.168.	103	. 200	192.168.	103	. 201	192.168.	103	. 202
126460	GABRIEL MARQUES CANHÃO	192.168.	103	. 204	192.168.	103	. 205	192.168.	103	. 206
126480	JOÃO MARIA FIGUEIREDO RIBEIRO	192.168.	103	. 208	192.168.	103	. 209	192.168.	103	. 210
126489	JOANA CATARINA NOGUEIRA GIÃO	192.168.	103	. 212	192.168.	103	. 213	192.168.	103	. 214
126541	JÉSSICA ZHENG	192.168.	103	. 216	192.168.	103	. 217	192.168.	103	. 218
127378	AFONSO MIGUEL LOUREIRO MELO	192.168.	103	. 220	192.168.	103	. 221	192.168.	103	. 222
127419	MIGUEL BATISTA LOPES	192.168.	103	. 224	192.168.	103	. 225	192.168.	103	. 226
127548	GONÇALO MEDEIROS MOURA	192.168.	103	. 228	192.168.	103	. 229	192.168.	103	. 230
129512	JORGE MANUEL MORAIS	192.168.	103	. 232	192.168.	103	. 233	192.168.	103	. 234
130382	VÍCTOR GIL SANZ	192.168.	103	. 236	192.168.	103	. 237	192.168.	103	. 238