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UT 03: Servicio DNS - Prácticas

Actividades de introducción

Realizar estas actividades básicas:

 Ejecutar el comando "nslookup <url>", donde <url> es alguna dirección web conocida. Observar la salida del comando. ¿Qué servidor DNS está respondiendo? ¿Qué direcciones IP se asocian con la URL?

```
$ nslookup www.amazon.com
Server: 127.0.0.53
Address: 127.0.0.53#53
Non-authoritative answer:
www.amazon.comcanonical name = www.cdn.amazon.com.
www.cdn.amazon.com canonical name = d3ag4hukkh62yn.cloudfront.net.
Name: d3ag4hukkh62yn.cloudfront.net
Address: 13.224.110.250
```

\$ nslookup	www.iesclaradelrey.es
Server:	127.0.0.53
Address:	127.0.0.53#53

Non-authoritative answer: Name: www.iesclaradelrey.es Address: 217.160.0.86 Name: www.iesclaradelrey.es Address: 2001:8d8:100f:f000::2b5

NOTA: Sobre la dirección stub-resolver 127.0.0.53:

(https://unix.stackexchange.com/questions/500536/what-are-dns-server-resolver-and-stub-resolver)

\$ dig @8.8.8.8 www.cidead.es +trace

```
; <<>> DiG 9.11.5-P4-5.1ubuntu2-Ubuntu <<>> @8.8.8.8 www.cidead.es +trace
; (1 server found)
;; global options: +cmd
                     54966 IN
                                  NS
                                         a.root-servers.net.
                    54966 IN NS
                                        b.root-servers.net.
                     54966 IN NS
                                        c.root-servers.net.
                     54966 IN NS
                                        d.root-servers.net.
                     54966 IN NS
                                        e.root-servers.net.
                     54966 IN NS
                                        f.root-servers.net.
                    54966INNSg.root-servers.net.54966INNSh.root-servers.net.54966INNSi.root-servers.net.
                                  NS
```



Materiales formativos de FP online propiedad del Ministerio de Educación y Formación Profesional Octubre 2019

CFGM: Sistemas Microinformáticos y Redes

Módulo: SERVICIOS EN RED - Curso: 2º - 2019/2020

22545 qgKR49di/uWZdCmRjOfo AL8/fnLsVHHi86IONxx5 V76Qoh1kR+rxlsdEqLou 0kxD0drILeEnIovw30XV C80lG7ZR+kC3ETFdHFAJ ;; Received 525 byte	54966 IN 54966 IN 54966 IN 54966 IN 54966 IN P IzjwTy04Be4u7i c4oidLL3CAiS37 wewkTS4l66CcVt aI+ECGNAEPooG6 hUOM6XfPNsHf3F s from 8.8.8.8	NS NS NS RRSIG LBJSK1dg QBkqpZRG 74hqcOtms cr/cgFp4l 5p6f1RAIG 57V+ya7W 8#53(8.8	<pre>j.root-servers.net. k.root-servers.net. l.root-servers.net. m.root-servers.net. NS 8 0 518400 20191121170000 20191108160000 i8XwwWMguvd94GTU00FGHuHIZnBUGdY8Xo2Ga4vEZyvBy93 qNsDckDDc6C9jLq syIEAjD0hbaSxGQ DjRBj9F12+D7feR dFnUDvA3EkCS/Ab thzbpX7TEkI+79D /Sij9A== .8.8) in 5 ms</pre>	
es. es. es. es. es.	172800 IN 172800 IN 172800 IN 172800 IN 172800 IN 172800 IN	NS NS NS NS NS	ns-ext.nic.cl. f.nic.es. g.nic.es. h.nic.es. ns1.cesca.es. ns-es.nic.fr.	
es.	172800 IN 172800 IN	NS NS	a.nic.es. sps-ph isc org	
es.	86400 IN	DS	29450 8 1	
417BEAFB46ABF3430B75	C5C29AEF785D47	76B60E1	20450 0 2	
8BEC32A2C9CFE42E393B	AF81FFE71B5210	03E940612	29450 8 2 2A4590B4763ADC5 39E4B563	
es. 22545 evhJRff8mjvjA1evGldQ 0zDmb4Ak3bhkBbwGNbmH yZeqXzUTJeXEaJ5QdVYs CEgKQMDFP/ZPR/5+AW22 C8TmEnFhGGMOVPq5gZKR ;; Received 938 byte	souther in si 5xAWI4bdoFwsIy Yv+3ZANxo05mV4 OvdICymplsQ85r saZAwRW0u45rL Om001xKWr8IQ/r s from 192.5.5	YHN5YXTp /CKb+sbH. ISN+aNQm CC/K2zAjo /YG5T+MM AAnW0ioq4 5.241#53	GPSUqiPiTgiGKN3gGG/SdZ/4vkQH37J1piXPmVA91MvN84G Jhgb//Ddu4a1GKt j+juhnUHxNRnjxW 6+NsS/a6EDQ+gvy /PHhq6O+pDAXkrJ 4nGMVpiJTsXb7m0 Be1Q8A== (f.root-servers.net) in 5 ms	
cidead.es.	86400 IN	NS	minerva.ttd.net.	
ouos11a8str8ujfj43d8 OUSJRFUFLHV7BCSINCL2	Normalization 18 100 10 100 10 100 10 10 10 10 10 10 10 10 10 10 10 10 10 1	NS 28. 864 NS SOA RI	artemis.ttd.net. 400 IN NSEC3 1 1 5 80B353D46FBB5584 RSIG DNSKEY NSEC3PARAM	
ouos11a8str8ujfj43d8 20191103000814 21 LYmylCYnxIZtE/W7yjsu	lnkjvsg5tn80.e 09 es. d sXaMExWgFkfhxI	es. 8640 Dyc9DHqm JObHz0BO	00 IN RRSIG NSEC3 8 2 86400 20191117075707 ASqhbtIHsJpVDy6/saK1IKcttRjiIXrMpGSubVMVq1vsL51 nYIOiF1dNc2OP9a	
fqv0a4mbmr9balhopap2	uamale3r2bu9.e	es. 864	400 IN NSEC3 1 1 5 80B353D46FBB5584	
FR0KB87B4UPSIDTVPDLG fqv0a4mbmr9balhopap2 20191102160719 21 z5rz1gKydXostzT6mYH2 Fa0p8m+n/t/DPXgeAGJb ;; Received 592 byte	AAUI71VFI5S7 N uamale3r2bu9.e 09 es. h mvEJX/YZ6UxteF oo34U0xyKwELHN s from 204.61.	NS DS RR 25. 8640 Iuo2INnL 83QuPjR MrOo1Dn80 217.1#5	SIG DO IN RRSIG NSEC3 8 2 86400 20191116230815 D3SFdRQkv3UfaRpLzIl1LYJgp+v60u+/4GJS/Eju34g5JgY J70M4wR2nMNdF2F C4yNnDF8fpK19rs tiY= 3(g.nic.es) in 42 ms	
www.cidead.es. cidead.es. cidead.es. ;; Received 109 byte	3600 IN 86400 IN 86400 IN s from 213.0.1	A NS NS L84.68#53	212.128.114.102 minerva.ttd.net. artemis.ttd.net. 3(minerva.ttd.net) in 13 ms	



2. Realizar el ejercicio anterior capturando con wireshark los paquetes transmitidos por la red. ¿Qué protocolos y puertos se están usando?

Eile	<u>File Edit View Go Capture Analyze Statistics Telephony Wireless Tools H</u> elp											
A	Apply a display filter < Ctri/>											
No.	Time *	Source	Destination	Protocol	Length Info							
	31 10.0752400	192.168.0.219	64.233.167.189	UDP	71 58748 - 443 Len=29							
	32 10.6646283	192.168.0.203	224.0.0.251	MDNS	412 Standard query resp	ionse 0x0000 PTR Google	Home-Min1-5d8bb02042eac0	9e6a958778f	40bdfef4googlecasttcp.local TXT, cache flush SRV, c	ache flush 0 0 8009 5d8bb		
	33 13.1217733	SamsungE_98:d8:27	Broadcast	ARP	60 Who has 192.168.0.2	? Tell 192.168.0.205						
	34 14.8939931	192.168.0.219	66.102.1.188	TCP	66 48912 → 5228 [ACK]	Seq=1 Ack=1 Win=501 Ler	1=0 TSval=3311684412 TSec	cr=12286065	43			
	35 14.9332625	66.102.1.188	192.168.0.219	TCP	68 [TCP ACKed unseen s	egment] 5228 - 48912 [/	ACK] Seq=1 Ack=2 Win=2/1	Len=0 TSva	1=1228651600 [Secr=3311188166			
	36 15.0328801	192.168.0.219	192.168.0.203	TCP	176 57564 - 8009 [PSH,	ACK] Seq=331 ACK=331 W	Ln=705 Len=110 TSval=3183	326063 TSec	r=4158391 [TCP segment of a reassembled PDU]			
	20 45 0422045	102 169 0 210	102 169 0 202	TCD	66 57564 . 9000 [ACK]	Sog=441 Ack=441 Win=70	Lon=0 TSvo1=210226074 T	Soor=41699	as a segment of a reassembled Pboj			
	39 15.1103412	192.168.0.219	89.58.61.254	DNS	89 Standard query 0xd3	32 A www.cdn.amazon.com	0 OPT	0001-41000	5L			
-L-	40 15.1167531	80.58.61.254	192.168.0.219	DNS	282 Standard query resp	ionse 0xd332 A www.cdn.a	amazon.com CNAME d3ag4huk	kkh62vn.clo	udfront.net A 13.224.110.250 NS ns-1144.awsdns-15.org N	S ns-130.awsdns-16.com NS		
	41 15.1181358	192.168.0.219	80.58.61.254	DNS	900 Standard query 0x63	21 AAAA d3ag4hukkh62yn	cloudfront.net OPT					
	42 15.1241474	80.58.61.254	192.168.0.219	DNS	1. Standard query resp	ionse 0x6321 AAAA d3ag4	hukkh62yn.cloudfront.net	SOA ns-130	.awsdns-16.com OPT			
91	5.1103412.	. 192.168.0.2	219	80.58.6	1.254	DNS	89 Standard	query	0xd332 A www.cdn.amazon.com OPT			
01	5.1167531.	. 80.58.61.25	54	192.168	.0.219	DNS	282 Standard	query	response 0xd332 A www.cdn.amazo	n.com CNAME d3ag4r		
11	5.1181358.	192.168.0.2	219	80.58.6	1.254	DNS	100 Standard	query	0x6321 AAAA d3aq4hukkh62vn.clou	dfront.net OPT		
2 1	5.1241474.	80.58.61.25	54	192.168	.0.219	DNS	181 Standard	query	response 0x6321 AAAA d3ag4hukkh	62yn.cloudfront.ne		

Para ver los puertos utilizados y más información de cada trama, miramos la parte inferior de la pantalla de wireshark:

<pre> Frame 40: 282 bytes on wire (2256 bits), 282 bytes captured (2256 bits) on interface 0 Ethernet II, Src: AskeyCom_91:81:77 (d4'7b:06):181:77), Dst: IntelCor_f5:13:ce (d4:25:8b:f5:13:ce) Internet Protocol Version 4, Src: 80.58.61.254, Dst: 192.168.0.219 User Datagram Protocol, Src Port: 53, Dst Port: 42833 Domain Name System (response) Transaction ID: 0xd332 Flags: 0xd180 Standard query response, No error Questions: 1 Answer RRs: 2 Authority RRs: 4 Additional RRs: 1 Queries Answers Authoritative nameservers Additional records [Request In: 39] [Time: 0.006411894 seconds] Ode 0 d0 exected as a dd fe exected as dd fe exected as a dd fe exected as dd fe exected as dd fe e</pre>																				
<pre>> Ethernet II, Src: AskeyCom_91:81:77 (d4:7b:b0:91:81:77), Dst: IntelCor_f5:13:ce (d4:25:8b:f5:13:ce) > Internet Protocol Version 4, Src: 80.58.61.254, Dst: 192.168.0.219 > User Datagram Protocol, Src Port: 53, Dst Port: 42833 > Domain Name System (response) Transaction ID: 0xd32 > Flags: 0x8180 Standard query response, No erro Questions: 1 Answer RRs: 2 Authority RRs: 4 Additional RRs: 1 Queries > Authority RRs: 4 Additional RRs: 1 Queries > Authority RRs: 39] [Time: 0.006411894 seconds] 0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 (x</pre>	Γ	١.	Fran	ne 4	0:	282	by	tes	on	Wİ	re (225	6 b:	its), 2	82	byt	es	cap	otured (2256 bits) on interface 0
<pre>> Internet Protocol Version 4, Src: 80:58.61.254, Dst: 192.168.0.219 > User Datagram Protocol, Src Port: 53, Dst Port: 42833 > Domain Name System (response) Transaction ID: 0xd322 > Flags: 0x8180 Standard query response, No error Questions: 1 Answer RRs: 2 Authority RRs: 4 Additional RRs: 1 > Queries > Answers > Authoritative nameservers > Additional records [Request In: 39] [Time: 0.006411894 seconds] </pre>		•	Ethe	erne	et I	Ι,	Src	: A	ske	yCo	m_91	:81	:f7	(d4	1:7t):b0):91	:81	:f7), Dst: IntelCor_f5:13:ce (d4:25:8b:f5:13:ce)
<pre>> User Datagram Protocol, Src Port: 53, Dst Port: 42833 > Domain Name System (response) Transaction ID: 0xd322 > Flags: 0x8180 Standard query response, No error Questions: 1 Answer RRs: 2 Authority RRs: 4 Additional RRs: 1 > Queries > Answers > Authoritative nameservers > Additional records [Time: 0.006411894 seconds] 0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 > Authoritative nameservers > Additional records [Time: 0.006411894 seconds] 0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 > Authoritative nameservers > Additional records [Time: 0.006411894 seconds] 0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 ></pre>		•	Inte	erne	et P	rot	oco	1 V	ers	ion	4,	Src	: 80	9.58	3.61	. 25	54,	Dst	: 1	92.168.0.219
<pre>> Domain Name System (response) Transaction ID: 0x0332 > Flags: 0x8180 Standard query response, No error Questions: 1 Answer RRs: 2 Authority RRs: 4 Additional RRs: 1 > Queries > Answers > Additional RRs: 1 > Queries > Answers > Authoritative nameservers > Additional records [Request In: 39] [Time: 0.006411894 seconds] </pre>		×.	User	Jser Datagram Protocol, Src Port: 53, Dst Port: 42833																
Transaction ID: 0xd332 > Flags: 0x8180 Standard query response, No error Questions: 1 Answer RRs: 2 Authority RRs: 4 Additional RRs: 1 > Queries > Answers > Authority RRs: 3 Additional RRs: 1 > Queries > Authoritative nameservers > Additional records [Request In: 39] [Time: 0.006411894 seconds]		-	Doma	Domain Name System (response)																
<pre>> Flags: 0x8180 Standard query response, No error Questions: 1 Answer RRs: 2 Authority RRs: 4 Additional RRs: 1 > Queries > Answers > Authoritative nameservers > Additional records [Request In: 39] [Time: 0.006411894 seconds]</pre>			Т	Transaction ID: 0xd332																
Questions: 1 Answer RRs: 2 Authority RRs: 4 Additional RRs: 1 Queries Authoritative nameservers Additional records [Request In: 39] [Time: 0.006411894 seconds]			.) E	Flags: 0x8180 Standard query response, No error																
Answer RRs: 2 Authority RRs: 4 Additional RRs: 1 Queries Answers Authoritative nameservers Additional records [Request In: 39] [Time: 0.006411894 seconds] 0000 04 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 %{ 010 01 cc 11 49 00 00 f8 11 60 dc 50 3a 3d fe c0 a8 020 00 db 00 35 a7 51 00 f8 d7 cf d3 32 81 80 00 01 021 00 dc 16 fe 03 36 ff 6d 00 00 100 01 c0 cc 0220 00 db 00 35 a7 51 00 f8 d7 cf d3 32 81 80 00 01 0230 00 92 00 04 00 01 03 77 77 77 70 36 36 46 6e 06 61w ww.cdn.a 0240 6d 17 a6 fe 6e 33 66 ff d0 00 01 00 01 c0 cc 0250 00 05 00 01 00 00 00 29 00 1f 0e 64 33 61 67 34) 0250 00 05 00 01 00 00 00 29 00 1f 0e 64 33 61 67 34) 0250 00 00 35 00 04 dd e0 6e fa c0 30 00 02 00 01 00 ront.net 0260 68 75 6b 6b 68 36 32 79 6e 0a 63 6 cf 75 64 66 hukkh62y n.cloudf 0990 02 a2 f9 00 17 07 6e 73 2d 31 31 34 34 09 61 77sn s-1144 aw 0980 02 a2 f9 00 13 06 6e 73 2d 31 33 30 09st.144 aw 0980 00 a1 00 2 a2 f9 00 13 06 6e 73 2d 32 31 09ns -130			0	Ouestions: 1																
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Additional RRs: 1 • Queries • Answers • Authoritative nameservers • Additional records [Request In: 39] [Time: 0.006411894 seconds] 0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 ·% ···· { ···· E· • Additional records [Request In: 39] [Time: 0.006411894 seconds] 0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 ·% ···· { ···· E· • 010 01 0c 11 49 00 00 f8 11 60 dc 50 3a 3d fe co a8 ··· I··· ·P:=··· 0020 00 db 00 35 a7 51 00 f8 d7 cf d3 28 18 80 00 11 ··· ·F:=··· 0030 00 22 00 04 00 01 03 77 77 77 03 63 64 6e 06 61 ····· ·W Ww.cdn.a 0046 d6 d1 7a 6f 6e 03 63 6f 6d 00 00 10 00 1c 00 cc mazon.co m······ 0055 00 05 00 01 00 00 00 29 00 1f 0e 64 33 617 34 ····· ··· · · · · · · · · · · · · ·			Authority RRs: 4																	
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0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 .%{E. 0010 01 0c 11 49 00 00 f8 11 60 dc 50 3a 3d fe co a8 IP:= 0020 00 db 00 35 a7 51 00 f8 d7 cf d3 32 81 80 00 01 5.Q2 0030 00 02 00 04 00 01 377 77 77 03 63 64 6e 06 61 ww ww.cdn.a 0040 6d 61 7a 6f 6e 03 63 6f 6d 00 00 01 00 01 c0 0c mazon.co m 0050 00 95 00 01 00 00 02 90 01 ff 0e 64 33 61 67 34)d3ag4 0066 68 75 6b 6b 68 36 32 79 6e 0a 63 6c ff 75 64 66 hukkh62y n.cloudf 0070 72 6f 6e 74 03 6e 65 74 00 c0 30 00 100 01 00 0080 00 02 32 f9 00 17 07 6e 73 2d 31 31 34 34 09 61 77 ns -1144 aw 0040 64 6e 73 2d 31 35 03 6f 72 67 00 c0 30 00 02 sdms-15 org.0 ns -130 0040 00 01 00 2a 2 f9 00 13 06 6e 73 2d 31 33 30 09 ns -130 0040 61 77 73 64 6e 73 2d 31 36 c0 1b c0 30 00 02 00 awsdns-1 6 0010 01 00 02 a2 f9 00 19 07 6e 73 2d 32 30 32 31 09 0040 61 77 73 64 6e 73 2d 36 00 26 36 f0 27 75 6b 00 awsdns-6 0.co.uk. 0040 00 02 00 01 00 01 00 02 a2 f9 00 13 06 6e 73 2d 32 awsdns-6 0.co.uk. </td <th></th> <td></td> <td>Ļ</td> <td>Tim</td> <td>ues o:</td> <td></td> <td>264</td> <td>110</td> <td></td> <td></td> <td>onde</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			Ļ	Tim	ues o:		264	110			onde	1								
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0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 ·%····{{··E· 0010 01 0c 11 49 00 00 f8 11 60 dc 50 3a 3d fe c0 a8 ·······P:=··· 0020 00 db 00 35 a7 51 00 f8 d7 cf d3 32 81 80 00 01 ······P:=··· 0030 00 02 00 04 00 01 03 77 77 70 36 63 64 6e 06 61 ·······W Ww.cdn.a 0040 6d 61 7a 6f 6e 03 63 6f 6d 00 00 01 00 01 c0 0c mazon.co m····· 0050 00 95 00 01 00 00 02 9 00 1f 0e 64 33 61 67 34 ······· 0050 00 95 00 01 00 00 02 9 00 1f 0e 64 33 61 67 34 ······ 0050 00 95 00 01 00 00 00 29 00 1f 0e 64 33 61 67 34 ······· 0050 00 95 00 01 00 00 00 29 00 1f 0e 64 33 61 67 34 ······· 0050 00 95 00 01 00 00 00 29 00 1f 0e 64 33 61 67 34 ······· 0050 00 95 00 01 00 00 00 29 00 1f 0e 01 00 01 00 ront.net ··0···· 0060 87 56 b6 b6 83 63 32 79 6e 0a 63 6c f7 5 64 66 hukkh62y n cloudf 0070 72 6f 6e 74 03 6e 65 74 00 c0 30 00 20 00 11 00 ······· ······ 0080 00 35 06 04 0d ee 6e fa c0 30 00 02 00 01 00 ············ ············ ··············· <																				
0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 ·%····{{ ···E: 0010 01 0c 11 49 00 00 f8 11 60 dc 50 3a 3d fe c0 as ····································																				
0000 d4 25 8b f5 13 ce d4 7b b0 91 81 f7 08 00 45 00 ····································	Ļ																			
0010 01 00 11 49 00 00 f8 11 60 dc 50 3a 3d fe c0 a8 I '.P:= 0020 00 db 00 35 a7 51 00 f8 d7 cf d3 32 81 80 00 01 F: 'P:= 0030 00 02 00 04 00 01 03 77 77 73 36 36 46 e0 66 1 F: 'P:= 0040 6d 61 7a 6f 6e 03 63 6f 6d 00 00 11 00 01 c0 0c mazon.co m www.cdn.a 0050 00 05 00 01 00 00 00 29 00 1f 0e 64 33 61 67 34)		00	000	d4	25	8b	f5	13	се	d4	7b	b0	91	81	f7	08	00	45	00	·%····{ ····E·
0020 00 00 03 a7 51 00 f6 d7 cf d3 28 80 00 01 5.Q. 2 0030 00 02 00 04 00 01 03 77 77 77 03 63 64 60 01 5.Q. 2 0040 64 67 66 03 63 64 60 01 c0 www.cdn.a 0050 00 05 00 01 00 01 00 01 c0	l	00	10	01	0c	11	49	00	00	f8	11	60	dc	50	3a	3d	fe	c0	a8	· · · I · · · · ` · P := · · ·
0030 00 02 00 04 00 1 03 77 77 70 3 63 64 60 61	l	00	20	00	db	00	35	a7	51	00	f8	d7	cf	d3	32	81	80	00	01	· · · 5 · Q · · · · · 2 · · · ·
0040 6d 61 7a 6f 6e 03 63 6f 6d 00 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 00 01 00 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 01 01 00 <	l	00	030	00	02	00	04	00	01	03	77	77	77	03	63	64	6e	06	61	·····w ww.cdn.a
0050 00 05 00 01 00 02 00 1f 0e 64 33 61 67 34) dag4 0060 68 75 6b 6b 83 62 27 9 6e 0a 63 6c 6f 75 64 66 74 03 6e 65 74 00 60 00 00 01 00 ront.net 0 0080 00 03 00 04 04 e0 6e fa 03 00 01 00 ront.net 0 0080 02 02 01 00 01 00 ront.net .0 0080 02 02 13 13 13 13 40 09 10 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0.	l	00)40	6d	61	7a	6f	6e	03	63	6f	6d	00	00	01	00	01	c0	0c	mazon co m·····
0060 68 75 6b 68 36 32 79 6e 0a 63 6c 6f 75 64 66 hukkh62y ncloudf 0070 72 6f 6e 74 03 6e 65 74 00 c0 03 00 01 00 100 100 nt nct net 00 00 nt net .00 00 00 35 00 04 00 6e 7a c0 00	l	00	050	00	05	00	01	00	00	00	29	00	1f	0e	64	33	61	67	34	·····) ···d3ag4
0070 72 6f 6e 74 03 6e 65 74 00 c0 30 00 01 00 01 00 ront.net 0080 00 03 50 04 de 6e fa c0 30 00 02 00 100	l	00	060	68	75	6b	6b	68	36	32	79	6e	0a	63	6c	6f	75	64	66	hukkh62y n·cloudf
0080 00 035 00 04 0d e0 6 fa c0 30 00 02 00 01 00	l	00	070	72	6f	6e	74	03	6e	65	74	00	c0	30	00	01	00	01	00	ront net · · O · · · ·
0090 02 a2 f9 00 17 07 6e 73 2d 31 31 34 34 09 61 77 s -1144.aw 00a0 73 64 6e 73 2d 31 35 03 6f 72 67 00 c0 30 00 2 sdms-15. org0 00b0 00 01 00 02 a2 f9 00 13 06 6e 73 2d 31 33 30 09 sdms-15. org0 00c0 61 77 73 64 6e 73 2d 31 36 c0 1b c0 30 00 02 00 awsdns-1 60 00c0 61 77 73 64 6e 73 2d 31 36 c0 1b c0 30 00 22 00 awsdns-1 60 00c0 61 77 73 64 6e 73 2d 36 30 02 63 6f 02 75 6b 00 awsdns-6 0.co.uk. 00c0 61 77 73 64 0e 73 2d 32 a2 190 02 63 6f 02 75 6b 00 awsdns-6 0.co.uk.	l	00	080	00	00	35	00	04	Θd	e0	6e	fa	c0	30	00	02	00	01	00	· · 5 · · · n · · 0 · · · ·
00a0 73 64 6e 73 2d 31 35 03 6f 72 67 00 c0 30 00 02 sdns-15 org.0 org.0 00b0 00 01 00 02 a2 f9 00 13 06 6e 73 2d 31 33 00 org.0	l	00	90	02	a2	f9	00	17	07	6e	73	2d	31	31	34	34	09	61	77	•••••ns -1144 aw
00b0 00 01 00 02 a2 f9 00 13 06 6e 73 2d 31 33 00	l	00)a0	73	64	6e	73	2d	31	35	03	6f	72	67	00	c0	30	00	02	sdns-15 org 0.
00c0 61 77 73 64 6e 73 2d 31 36 c0 1b c0 30 00 02 00 awsdns-1 60 00r00 01 00 02 a2 f9 00 19 07 6e 73 2d 32 30 32 31 90	1	00	0d0	00	01	00	02	a2	f9	00	13	06	6e	73	2d	31	33	30	09	····· ns-130·
00d0 01 00 02 a2 f9 00 19 07 6e 73 2d 32 30 32 31 09 ns-2021. 00e0 61 77 73 64 6e 73 2d 36 6f 02 75 6b 00 awsdns-6 0.co.uk. 00f0 c0 30 02 03 13 06 6e 73 2d 0 ns-		00)c0	61	77	73	64	6e	73	2d	31	36	c0	1b	c0	30	00	02	00	awsdns-1 6···0···
00e0 61 77 73 64 6e 73 2d 30 02 63 6f 02 75 6b 00 awsdns-6 0 cco·uk 00f0 c0 30 00 02 03 01 00 02 02 03 06 6e 73 2d 0······ ···· ·ns-	1	00	0b(01	00	02	a2	f9	00	19	07	6e	73	2d	32	30	32	31	09	····· ns-2021·
00f0 c0 30 00 02 00 01 00 02 a2 f9 00 13 06 6e 73 2d 00000000000000000000000000000000000	1	00	e0	61	77	73	64	6e	73	2d	36	30	02	63	6f	02	75	6b	00	awsdns-6 0.co.uk
		00	0f0	c0	30	00	02	00	01	00	02	a2	f9	00	13	06	6e	73	2d	• 0 • • • • • • • • • • • • • • • • • •



<u>File Edit View Go</u>	Capture Analyze Statistics	Telephony Wireless I	ools <u>H</u> elp	
	🗅 🔝 🛣 🛄 🔇	• • • • • • • •		
Apply a display filter	. <ctrl-></ctrl->			
lo. Time	Source	Destination	Protocol	Length Info
75 17.6044532	192.168.0.219	192.168.0.203	TCP	66 57564 → 8009 [ACK] Seq=441 Ack=441 Win=705 Len=0 TSval=319273812 TSecr=4253671
	IntelCor_f5:13:ce	Itu-T_52:76:96		60 U, func=UI; SNAP, OUI 0x00139D (MaxLinear Hispania S.L.U.), PID 0x0C01
77 19.2350343	192.168.0.219	80.58.61.254	DNS	88 Standard query 0x37a4 A iesclaradelrey.es OPT
- 78 19.2710034	80.58.61.254	192.168.0.219	DNS	104 Standard query response 0x37a4 A iesclaradelrey.es A 217.160.0.86 OPT
79 19.2724731	192.168.0.219	80.58.61.254	DNS	38 Standard query 0x0444 AAAA lesclaradelrey.es UPI
81 19 5587441	fe80::d67h:b0ff:fe01:	192.108.0.219	TCMPV6	78 Router Advertisement from d4-76-b0-91-81-67
82 20,4801966	SamsungE 98:d8:27	Broadcast	ARP	60 Who has 192,168,0,22 Tell 192,168,0,205
83 21,7098198	64,233,167,189	192,168,0,219	UDP	82 443 → 58748 Len=40
84 21.7173841	192.168.0.219	64.233.167.189	UDP	71 58748 → 443 Len=29
85 22.0166508	192.168.0.2	224.0.0.1	IGMPv2	60 Membership Query, general
86 22.0166865	fe80::d67b:b0ff:fe91:.	. ff02::1	ICMPv6	90 Multicast Listener Query
87 22.0289204	fe80::3d90:9b4e:c785:	. ff02::16	ICMPv6	110 Multicast Listener Report Message v2
88 22.6052772 89 22.6160259	192.168.0.219 192.168.0.203	192.168.0.203	TCP	176 5/564 → 8009 [PSH, ACK] Seq=441 Ack=441 Win=705 Len=110 ISval=3192/8813 ISecr=42536/1 176 8009 → 57564 [PSH, ACK] Seq=441 Ack=551 Win=444 Len=110 TSval=4254172 TSecr=319278813
Destination Por Length: 70 Checksum: 0xa54 [Checksum Statt [Stream index: + [Timestamps] Domain Name Syste Transaction ID: + Flags: 0x8180 S Ousetions: 1	t: 58055 49 [unverified] 18: Unverified] 10] m (response) : 0X37a4 Standard query response,	No error		
Answer RRs: 1 Authority RRs: Additional RRs: Queries > iesclaradelr Answers	0 : 1 ey.es: type A, class IN			
<pre>> iesclaradelr > Additional reco > <root>: type [Request In: 77 [Time: 0.035965]</root></pre>	ey.es: type A, class IN ords OPT 7] 9129 seconds]	, addr 217.160.0.86		
0000 d4 25 8b f5 1 001 00 5a 00 00 4 0020 00 db 00 5a 00 00 0030 00 01 00 66 65 67 72 65 0050 01 00 01 00	13 ce d4 7b b0 91 81 f 16 00 39 11 f1 d7 50 3 ≥2 c7 00 46 a5 49 37 a 30 01 0e 69 65 73 63 6 9 62 65 73 60 00 1 0 00 00 00 00	7 08 00 45 00 .% a 3d fe c0 a8 .Z 4 81 80 00 01 c 61 72 61 64 0 01 c0 0c 00 elre 0 56 00 00 29	@ 9 P:= F I7 i escla y es	E

3. Investigar las características y propietarios de los dominios oficialmente registrados, que pueden encontrarse en la web http://www.iana.org/domains/root/db/ ¿Qué empresa o persona es responsable de administrar el dominio ".es"?

Visitar:

https://www.iana.org/domains/root/db/es.html

4. Elegir un posible nombre de dominio para una nueva empresa. Acceder a la web de algún registrador de nombres de dominio y hacer la simulación de la contratación del dominio. ¿Qué precios y características tienen los servicios investigados?

... Buscar en dominios.es y explorar las posibilidades para dar de alta dominios...



- 5. Ejecutar las siguientes consultas DNS y explicar los resultados:
 - \$ nslookup www.google.es 8.8.8.8
 - \$ nslookup www.google.es ns1.google.com

En la primera búsqueda obtenemos la dirección del servidor de dominio <u>www.google.es</u> a través del servidor DNS 8.8.8.8.

En la segunda buscamos la misma dirección a través del servidor DNS 216.239.32.10. Ambos responden con la misma IP en versión 6, diferente en v4.

(Ver https://tecadmin.net/authoritative-non-authoritative-dns-server/)

```
jose@Audax:~$ nslookup google.com 8.8.8.8
Server: 8.8.8.8
Address: 8.8.8.8#53
Non-authoritative answer:
Name: google.com
Address: 172.217.16.238
Name: google.com
Address: 2a00:1450:4003:80b::200e
jose@Audax:~$ nslookup google.com ns1.google.com
Server: ns1.google.com
Address: 216.239.32.10#53
Name: google.com
Address: 172.217.17.14
Name: google.com
Address: 2a00:1450:4003:802::200e
```

- 6. Ejecutar el siguiente comando y observar la salida:
 - \$ dig @8.8.8.8 www.madrid.org +trace

dig es un comando que interroga a los servidores DNS a través de internet, mostrando la información que se les requiere. En este caso, sobre el dominio <u>www.madrid.org</u>

El comando investigará la información disponible sobre <u>www.madrid.org</u> en todos los servidores de la jerarquía DNS a partir del servidor DNS del dominio desde el que estamos buscando la información.



; <<>> DiG 9.11.5-P4-5.1ubuntu2-Ubuntu <<>> @8.8.8.8 www.madrid.org +trace ; (1 server found) ;; global options: +cmd 15137 ΤN NS g.root-servers.net. d.root-servers.net. 15137 ΤN NS 15137 NS f.root-servers.net. IN NS c.root-servers.net. 15137 ΤN 15137 IN NS a.root-servers.net. 15137 NS l.root-servers.net. ΤN 15137 ΤN NS i.root-servers.net. 15137 NS IN j.root-servers.net. 15137 k.root-servers.net. ΤN NS 15137 ΤN NS b.root-servers.net. 15137 ΙN NS m.root-servers.net. 15137 ΤN NS h.root-servers.net. 15137 ΤN NS e.root-servers.net. 15137 ΤN RRSIG NS 8 0 518400 20191110170000 20191028160000 22545 M1huSfVid4zXElkJgH34yibkWi1vXOz2uGActG+4JuJg1aAuF1vS/7mc 6+3JdMTUaHocL3sv092+0oIluw0mn0PPiPdE0YiT8Svk0l0m6FiDPLda WboquL0bbw/TXAdhP43XFyVew4/hIy2RQL5G3JLk0gsbM08PfQXZovbJ eL8pdNyGr2/6WrmXeWsuAs9MjKNSMLgLyDIE965pow997Paurzlb0rOH H8+ LqcSWTfovJxXhmhtGqDH/j/spDF7cr7tVVhYc9hyLhoOqzIgHN0qcMfH +GHdLPdJyoRyjAwyxkdtd0X+VU5v0NnDBxu4X5YRrInwscwp/FnPf EkwNFg== ;; Received 525 bytes from 8.8.8.8#53(8.8.8.8) in 7 ms org. 172800 IN NS d0.org.afilias-nst.org. org. 172800 TN NS a2.org.afilias-nst.info. 172800 ΙN NS b0.org.afilias-nst.org. org. NS c0.org.afilias-nst.info. 172800 org. ΤN 172800 IN NS a0.org.afilias-nst.info. ога. 172800 ΙN NS b2.org.afilias-nst.org. org. 9795 7 1 364DFAB3DAF254CAB477B5675B10766DDAA24982 org. 86400 ΤN DS 86400 DS 9795 org. IN 7 3922B31B6F3A4EA92B19EB7B52120F031FD8E05FF0B03BAFCF9F891B FE7FF8E5 86400 IN RRSIG DS 8 1 86400 20191111170000 20191029160000 22545 . ога YmUjJ0D2W3N107Pd5rYKK6iOY+gbw7kDKhzkLSKRmk6CSeJGwwU+NrmL eVmYXHJd3V3x4bmt9VrSsrpHpZgaJY7EZdmJCIuCGaBbKcPH2mPstKAx U/uFfza2YAqpHhyFx8rvk4xPLJK6PMse/9M7ivPI4h3dy5xyXoqNUmo2 E8bxVe1L0oyzjQp4U5Jn/lH1JeKrEpzWKaSnkXDenjaIcVhED2cgFnQ/ cgk519hokYSOFCr1LZ4ETZucZ+Vkl7SMWYoX6VnlpNlIuEU6ZaGh800n EWyZbRmwZZ26Tkfa+AeaMxEzZFo6t7SABkGPW/uTlMKhNolh6xuccEYQ MTZKxg== ;; Received 816 bytes from 202.12.27.33#53(m.root-servers.net) in 27 ms NS madrid.org. 86400 IN ΤN icmcom.madrid.org. madrid.org. 86400 NS olimpia.madrid.org. h9p7u7tr2u91d0v0ljs9l1gidnp90u3h.org. 86400 ΤN NSEC3 1 1 D399EAAB 1 H9PAES2EQ3K44BAR1F3TIU00J45719RJ NS SOA RRSIG DNSKEY NSEC3PARAM h9p7u7tr2u91d0v0ljs9l1gidnp90u3h.org. 86400 IN RRSIG NSEC3 7 2 86400 20191119184616 20191029174616 nrG0w7rJJacivxd0fKH3opb5NWe7PDhAjb0XTVZUfbod1oh0psuA8qsv 36752 org. ci22T9M+2bhUidjGFLCB3WHv8rEtc77xhI2vtUSGZFdmUMDu6aYuOC2k Fl4LNaBWqZ2IYnnHU9w/5/dX1bhGeEAGFCHXDb/XUZBOgOQqyNySo1cP w68= 49mid4kgm2ag3ed7rk4dt2kigumr5at3.org. 86400 NSEC3 1 1 1 D399EAAB IN 49N00PMB9F0GFDM63SJ5QSC5EE9MRP54 A RRSIG 49mid4kgm2ag3ed7rk4dt2kigumr5at3.org. 86400 IN RRSIG NSEC3 7 2 86400 20191115152753 20191025142753 ErKCe0I8cSHBWNVA5i/1f/C6ySn6V81c2jNBGjEhR2pfGsoqsJUaXVcq 36752 org. w+iVldsAFZXCaGb7oVeYmtU7cOwY3EQUMrWhkOyNhOvjoogJq06/nQZ/ QCA3p72PPwh8pR5zyXMycgpdzBduUj1JTkFMycEH+Kf6bhWYR71t3RsJ WxI= ;; Received 611 bytes from 199.249.120.1#53(b2.org.afilias-nst.org) in 36 ms www.madrid.org. ΙN CNAME www.madrid.org.c.footprint.net. 1800 ;; Received 87 bytes from 213.0.53.140#53(olimpia.madrid.org) in 8 ms



Materiales formativos de FP online propiedad del Ministerio de Educación y Formación Profesional Octubre 2019

7. Ejecutar los siguientes comandos para obtener los registros DNS de una web conocida:

\$ dig @8.8.8.8 madrid.org SOA \$ dig @8.8.8.8 madrid.org NS \$ dig @8.8.8.8 madrid.org A jose@Audax:~\$ dig @8.8.8.8 madrid.org SOA ; <<>> DiG 9.11.5-P4-5.1ubuntu2-Ubuntu <<>> @8.8.8.8 madrid.org SOA ; (1 server found) ;; global options: +cmd ;; Got answer: ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 44594 ;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1 ;; OPT PSEUDOSECTION: ; EDNS: version: 0, flags:; udp: 512 ;; QUESTION SECTION: ;madrid.org. ΤN SOA ;; ANSWER SECTION: madrid.org. 3599 ΤN SOA ddi-gm.madrid.org. mail.icmcom.madrid.org. 2013031078 43200 7200 2592000 172800 ;; Query time: 50 msec ;; SERVER: 8.8.8.8#53(8.8.8.8) ;; WHEN: mar oct 29 19:58:31 CET 2019 ;; MSG SIZE rcvd: 94 jose@Audax:~\$ dig @8.8.8.8 madrid.org NS ; <<>> DiG 9.11.5-P4-5.1ubuntu2-Ubuntu <<>> @8.8.8.8 madrid.org NS ; (1 server found) ;; global options: +cmd ;; Got answer: ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 38103 ;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 1 ;; OPT PSEUDOSECTION: ; EDNS: version: 0, flags:; udp: 512 ;; QUESTION SECTION: IN NS ;madrid.org. ;; ANSWER SECTION: NS madrid.org. 3398 ΤN icmcom.madrid.org. madrid.org. olimpia.madrid.org. 3398 IN NS ;; Query time: 41 msec ;; SERVER: 8.8.8.8#53(8.8.8.8) ;; WHEN: mar oct 29 19:58:40 CET 2019 ;; MSG SIZE rcvd: 82 jose@Audax:~\$ dig @8.8.8.8 madrid.org A ; <<>> DiG 9.11.5-P4-5.1ubuntu2-Ubuntu <<>> @8.8.8.8 madrid.org A ; (1 server found) ;; global options: +cmd ;; Got answer: ;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 26106 ;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1 ;; OPT PSEUDOSECTION:



Materiales formativos de FP online propiedad del Ministerio de Educación y Formación Profesional Octubre 2019

CFGM: Sistemas Microinformáticos y Redes

Módulo: SERVICIOS EN RED – Curso: 2º – 2019/2020

; EDNS: version: 0, flags:; udp: 512 ;; QUESTION SECTION: ;madrid.org. IN	A		
;; AUTHORITY SECTION: madrid.org. 1608 IN 2013031078 43200 7200 2592000 172800	SOA	ddi-gm.madrid.org.	mail.icmcom.madrid.or
;; Query time: 7 msec ;; SERVER: 8.8.8.8#53(8.8.8.8) ;; WHEN: mar oct 29 19:58:42 CET 2019 ;; MSG SIZE rcvd: 94			

- 8. En un sistema Windows, consultar el contenido de la cache DNS mediante el comando:
 - > ipconfig /displaydns

Ejemplo:

Command Prompt	-	×
Microsoft Windows [Version 10.0.16299.309] (c) 2017 Microsoft Corporation. All rights reserved.		^
C:\Users\panos>ipconfig /displaydns		
Windows IP Configuration		
csi.gstatic.com		
Record Name : csi.gstatic.com Record Type : 1 Time To Live : 1 Data Length : 4 Section : Answer A (Host) Record : 216.58.207.227 netbeez.zendesk.com		
Record Name : netbeez.zendesk.com Record Type : 1 Time To Live : 809 Data Length : 4 Section : Answer A (Host) Record : 52.34.200.91		
Record Name : netbeez.zendesk.com Record Type : 1 Time To Live : 809		~



Configuración de servicio DNS

Realizamos la práctica indicada en los enunciados:

Configuraciones de red iniciales: (solo con IP fijas y sin puerta de enlace)

```
jose@servidordns:~$ ip a
(...)
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen
1000
    link/ether 08:00:27:b6:ae:24 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
      valid_lft 84407sec preferred_lft 84407sec
    inet6 fe80::ca58:e691:1ea6:5d95/64 scope link noprefixroute
      valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen
1000
    link/ether 08:00:27:9a:bb:aa brd ff:ff:ff:ff:ff
   inet 192.164.100.254/24 brd 192.164.100.255 scope global noprefixroute enp0s8
      valid_lft forever preferred_lft forever
    inet6 fe80::414d:9956:48a0:dda/64 scope link noprefixroute
      valid_lft forever preferred_lft forever
jose@clientedns:~$ ip a
(...)
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen
1000
    link/ether 08:00:27:69:33:74 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
       valid_lft 86264sec preferred_lft 86264sec
    inet6 fe80::2af2:1812:908d:5c32/64 scope link noprefixroute
      valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen
1000
    link/ether 08:00:27:d5:4e:0f brd ff:ff:ff:ff:ff:ff
    inet 192.168.100.1/24 brd 192.168.100.255 scope global noprefixroute enp0s8
       valid_lft forever preferred_lft forever
    inet6 fe80::395a:2664:621b:e42a/64 scope link noprefixroute
      valid_lft forever preferred_lft forever
jose@clientedns:~$ ping 192.168.100.254
PING 192.168.100.254 (192.168.100.254) 56(84) bytes of data.
64 bytes from 192.168.100.254: icmp_seq=1 ttl=64 time=0.925 ms
^C
--- 192.168.100.254 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1000ms
rtt min/avg/max/mdev = 0.849/0.887/0.925/0.038 ms
```



Configuración de cliente DNS

Antes de configurar el servicio DNS por la red interna, verificamos que nuestra máquina está conectada a la red y a los servicios DNS de internet:

```
jose@clientedns:~$ ping www.google.es
PING www.google.es (172.217.16.227) 56(84) bytes of data.
64 bytes from mad08s04-in-f3.1e100.net (172.217.16.227): icmp_seq=1 ttl=63 time=4.78 ms
64 bytes from mad08s04-in-f3.1e100.net (172.217.16.227): icmp_seq=2 ttl=63 time=4.80 ms
^C
--- www.google.es ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 4.785/4.794/4.804/0.069 ms
jose@clientedns:~$ nslookup www.google.es
Server: 127.0.0.53
Address: 127.0.0.53#53
```

Non-authoritative answer: Name: www.google.es Address: 172.217.16.227 Name: www.google.es Address: 2a00:1450:4003:804::2003

Sin embargo, todavía no hemos configurado nuestro dominio miclase.local

jose@clientedns:~\$ nslookup miclase.local Server: 127.0.0.53 Address: 127.0.0.53#53 ** server can't find miclase.local: NXDOMAIN

Nuestro cliente es capaz de conectar consigo mismo a través del nombre, pero no reconoce el nombre de otros equipos que están en su red, ni el del dominio:

```
jose@clientedns:~$ ping clientedns
PING clientedns (127.0.1.1) 56(84) bytes of data.
64 bytes from clientedns (127.0.1.1): icmp_seq=1 ttl=64 time=0.050 ms
^C
--- clientedns ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1011ms
rtt min/avg/max/mdev = 0.050/0.060/0.070/0.010 ms
jose@clientedns:~$ ping servidordns
ping: servidordns: Name or service not known
jose@clientedns:~$ ping clientedns.miclase.local
ping: clientedns.miclase.local: Name or service not known
```



Vamos a realizar varias aproximaciones a la solución:

1. Resolución mediante fichero de hosts

La primera forma de trabajar con nombres de equipos es la utilización de un archivo de hosts.

En **Windows** tendríamos que editar el fichero %SYSTEMR00T%\system32\drivers\etc\hosts, añadiendo una entrada para servidordns, servidordns.miclase.local y clientedns.miclase.local, indicando las IPs correspondientes.

En Linux tendríamos que editar el fichero /etc/hosts. Quedaría así:

jose@clientedns:/etc\$ cat hosts
127.0.0.1 localhost
127.0.1.1 clientedns
Equipos de la red local
192.168.100.1 clientedns
192.168.100.254 servidordns
192.168.100.254 servidordns.miclase.local

Y ahora sí tendríamos conectividad usando los nombres de los equipos:

```
jose@clientedns:/etc$ ping servidordns
PING servidordns (192.168.100.254) 56(84) bytes of data.
64 bytes from servidordns (192.168.100.254): icmp_seq=1 ttl=64 time=0.679 ms
^C
--- servidordns ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 0.679/0.784/0.889/0.105 ms
jose@clientedns:/etc$ ping servidordns.miclase.local
PING servidordns.miclase.local (192.168.100.254) 56(84) bytes of data.
64 bytes from servidordns (192.168.100.254): icmp_seq=2 ttl=64 time=0.823 ms
^C
```

(Pero NO hemos utilizado DNS)

2. Configuración de cliente DNS

Revertimos el fichero /etc/host para cambiar la configuración a DNS. En estos momentos, el cliente no es capaz de encontrar al servidor mediante nombre (aunque sí mediante IP):

```
jose@clientedns:/etc$ ping servidordns
ping: servidordns: Name or service not known
jose@clientedns:/etc$ ping 192.168.100.254
PING 192.168.100.254 (192.168.100.254) 56(84) bytes of data.
64 bytes from 192.168.100.254: icmp_seq=1 ttl=64 time=0.795 ms
```



Para configurar el cliente DNS y tener capacidad de resolución por nombres de máquinas y de dominios, tenemos que modificar/revisar dos ficheros de configuración:

/etc/nsswitch.conf - Debemos asegurarnos de que está activa la opción dns: hosts: files mdns4_minimal [NOTFOUND=return] dns myhostname

/etc/resolv.conf - Tradicionalmente, se añade al servidor en una línea "nameserver"

```
jose@clientedns:/etc$ cat resolv.conf
(...)
nameserver 192.168.100.254
```

Sin embargo, esta forma de configurar DNS ya no es válida en Ubuntu 18.04. Para hacerlo más fácil podemos recurrir a la interfaz gráfica:

Cancel				Wired		Apply
etails	Identity	IPv4	IPv6	Security		
IPv4	Method	(O Auto	omatic (DHCP)	O Link-Local Only	
		1	O Mar	nual	○ Disable	
Addr	esses					
_	Address	<u>.</u>		Netmask	Gateway	_
192.	168.100.1		255	5.255.255.0		0
						8
DNS	168.100.25	54			Automatic ON	
Separa	te IP addres	ses with	comma	5		
Rout	es				Automatic ON	

Pero para que funcione, el servidor debe tener configurado DNS (y aún no lo tenemos).



Configuración de servidor DNS

Usaremos el servidor DNS Bind, que debemos instalar en la máquina servidordns:

jose@servidordns:/etc\$ sudo apt-get install bind9 Reading package lists... Done Building dependency tree Reading state information... Done The following additional packages will be installed: bind9utils net-tools python3-ply Suggested packages: bind9-doc resolvconf python-ply-doc The following NEW packages will be installed: bind9 bind9utils net-tools python3-ply 0 upgraded, 4 newly installed, 0 to remove and 3 not upgraded. Need to get 854 kB of archives. After this operation, 4.353 kB of additional disk space will be used. Do you want to continue? [Y/n] (...)

Aparece un nuevo demonio en ejecución, denominado "named":

jose@serv	idordn	s:/etcs	5 p:	s -ef	дгер	named	
bind	4727	1	0 (0:30	?	00:00:00	/usr/sbin/named -f -u bind
jose	4799	1763	0 (90:30	pts/0	00:00:00	grepcolor=auto named

Vemos que ha abierto los puertos 53 TCP y UDP:

jose@s	ervidordn	s:/e	tc\$ netstat -ltun		
Active	Internet	coni	nections (only servers		
Proto	Recv-Q Se	nd-Q	Local Address	Foreign Address	State
tcp	Θ	0	192.168.100.254:53	0.0.0.0:*	LISTEN
tcp	Θ	0	10.0.2.15:53	0.0.0:*	LISTEN
tcp	Θ	0	127.0.0.1:53	0.0.0:*	LISTEN
tcp	Θ	0	127.0.0.53:53	0.0.0:*	LISTEN
(\ldots)					
udp	Θ	0	192.168.100.254:53	0.0.0:*	
udp	Θ	0	10.0.2.15:53	0.0.0:*	
udp	Θ	0	127.0.0.1:53	0.0.0:*	
udp	19200	0	127.0.0.53:53	0.0.0:*	
()					



Los ficheros de configuración del servicio están en /etc/bind

```
jose@servidordns:/etc/bind$ ls -al
total 68
drwxr-sr-x 2 root bind 4096 oct 20 00:29 .
drwxr-xr-x 122 root root 12288 oct 20 00:29 .
-rw-r--r-- 1 root root 2761 ago 10 08:26 bind.keys
-rw-r--r-- 1 root root 237 mar 23 2018 db.0
-rw-r--r-- 1 root root 237 mar 23 2018 db.127
-rw-r--r-- 1 root root 237 mar 23 2018 db.255
-rw-r--r-- 1 root root 353 mar 23 2018 db.255
-rw-r--r-- 1 root root 353 mar 23 2018 db.local
-rw-r--r-- 1 root root 3171 mar 23 2018 db.local
-rw-r--r-- 1 root root 3171 mar 23 2018 db.local
-rw-r--r-- 1 root root 3171 mar 23 2018 db.root
-rw-r--r-- 1 root bind 463 mar 23 2018 named.conf
-rw-r--r-- 1 root bind 463 mar 23 2018 named.conf.default-zones
-rw-r--r-- 1 root bind 165 mar 23 2018 named.conf.local
-rw-r--r-- 1 root bind 165 mar 23 2018 named.conf.local
-rw-r--r-- 1 bind bind 77 oct 20 00:29 rndc.key
-rw-r--r-- 1 root 1317 mar 23 2018 zones.rfc1918
```

Los ficheros de configuración que debemos modificar son named.conf.local (registros de recursos de zonas) y named.conf.options (opciones locales)

Guardaremos una copia de estos dos ficheros de configuración y a continuación realizaremos los cambios oportunos:

- 1. Para que el servidor actúe como maestro y tenga autoridad sobre el dominio miclase.local, añadiremos un registro NS para servidordns.miclase.local
- 2. Daremos de alta el nombre de clientedns.miclase.local (registro A)
- 3. Configuraremos además varios alias (registros CNAME)
 - <u>ns1.miclase.local</u> alias de servidordns.miclase.local
 - <u>www.miclase.local</u> alias de servidordns.miclase.local
 - <u>ftp.miclase.local</u> alias de servidordns.miclase.local
 - mail.miclase.local alias de clientedns.miclase.local
- 4. El equipo <u>clientedns.miclase.local</u> actuará como servidor de correo del dominio (registro MX)
- 5. El tiempo en cache de las respuestas negativas será de 3 horas.

Con todas estas premisas, realizamos las operaciones indicadas editando los ficheros que se encuentran en /etc/bind:



jose@servidordns:/etc/bind\$ cat named.conf.local

```
//
// Do any local configuration here
//
// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";
//
//Zona de búsqueda directa
zone "miclase.local"{
    type master;
    file "/etc/bind/db.miclase.local";
};
```

jose@servidordns:/etc/bind\$ cat db.miclase.local

```
; Fichero db.miclase.local
$TTL 1D
                       miclase.local. administrador.miclase.local. (
0
       IN
               SOA
                                       ; Serial
                       1
                       604800
                                      ; Refresh
                       86400
                                       ; Retry
                                      ; Expire
                       2419200
                       10800)
                                       ; Negative Cache TTL (3 horas)
; Servidores DNS del dominio
             ΤN
                     NS
                             servidordns.miclase.local.
; Hosts
clientedns
             IN
                     Α
                             192.168.100.1
servidordns
                            192.168.100.254
            IN
                    А
; Alias
       ΤN
               CNAME
                     servidordns
ns1
WWW
        ΙN
               CNAME
                       servidordns
ftp
        ΙN
               CNAME
                       servidordns
                      clientedns
                CNAME
mail
        ΤN
 Servidores de correo (MTA)
;
               MX
                       10
                               clientedns
0
       ΙN
```

Tras editar los ficheros, comprobamos que no hay error de configuración:

```
jose@servidordns:/etc/bind$ sudo named-checkconf /etc/named.conf
jose@servidordns:/etc/bind$ sudo named-checkzone miclase.local
/etc/bind/db.miclase.local
zone miclase.local/IN: loaded serial 1
OK
```



A continuación reiniciamos el servicio bind9:

Y por último chequeamos que **el servidor está resolviendo nombres** para el dominio que hemos creado, miclase.local. Veamos cómo funciona correctamente para el comando nslookup y también conecta con la máquina cliente a través de un ping al nombre que hemos configurado en DNS:

jose@servidordns:/etc\$ nslookup servidordns Non-authoritative answer: Name: servidordns Address: 127.0.1.1 jose@servidordns:/etc\$ nslookup servidordns.miclase.local Non-authoritative answer: Name: servidordns.miclase.local Address: 192.168.100.254 jose@servidordns:/etc\$ nslookup mail.miclase.local Non-authoritative answer: mail.miclase.local canonical name = clientedns.miclase.local. Name: clientedns.miclase.local Address: 192.168.100.1 jose@servidordns:/etc\$ ping clientedns.miclase.local PING clientedns.miclase.local (192.168.100.1) 56(84) bytes of data.

64 bytes from 192.168.100.1 (192.168.100.1): icmp_seq=1 ttl=64 time=0.741 ms

Para verificar que hemos configurado bien el servidor DNS, podemos dar de alta un nuevo cliente. Por ejemplo, usamos una máquina que conectamos a nuestra red con la IP 192.168.100.5, la configuramos para que resuelva por DNS y que se conecte al Servidor DNS que hemos creado (IP 192.168.100.254). Este es el resultado:

oracle@localhost etc]\$ ip a (...)inet 192.168.100.5/24 brd 192.168.100.255

```
[oracle@localhost etc]$ cat /etc/resolv.conf
# Generated by NetworkManager
nameserver 192.168.100.254
```

[oracle@localhost etc]\$ ping servidordns.miclase.local
PING servidordns.miclase.local (192.168.100.254) 56(84) bytes of data.
64 bytes from 192.168.100.254 (192.168.100.254): icmp_seq=1 ttl=64 time=0.799 ms



```
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```

Configuración de resolución inversa

Para configurar correctamente la resolución inversa en nuestro dominio miclase.local debemos añadir los registros apropiados en los ficheros de configuración.

En /etc/bind/named.conf.local añadimos la configuración para búsqueda inversa:

```
(...)
//Zona de búsqueda inversa
zone "0.100.168.192.in-addr.arpa"{
    type master;
    file "/etc/bind/db.100.168.192";
};
```

Y a continuación añadimos el fichero /etc/bind/db.100.168.192

```
; BIND reverse data file for 192.168.100
$TTL 1D
SORIGIN 100.168.192.in-addr.arpa.
           SOA servidordns.miclase.local. root.miclase.local. (
     ΤN
0
                             1242760444
                             14400
                             3600
                             60480
                             604800
)
     IN
           NS
                 servidordns.miclase.local.
254.100.168.192.in-addr.arpa. IN
                                         servidordns.miclase.local.
                                   PTR
                                         clientedns.miclase.local.
1.100.168.192.in-addr.arpa. IN
                                   PTR
```

Comprobamos el funcionamiento de la resolución inversa:

jose@servidordns:/etc/bind\$ host 192.168.100.254 254.100.168.192.in-addr.arpa domain name pointer **servidordns**.

