Departamento de Computación,
Facultad de Ciencias Exactas y Naturales,
Universidad de Buenos Aires

Trabajo Práctico 2

Teoría de las Comunicaciones

Primer Cuatrimestre de 2014

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Índice

1. Introducción

En este trabajo estudiamos un método para detectar enlaces submarinos en la traza de paquetes entre dos hosts conectados a internet.

2. Desarrollo

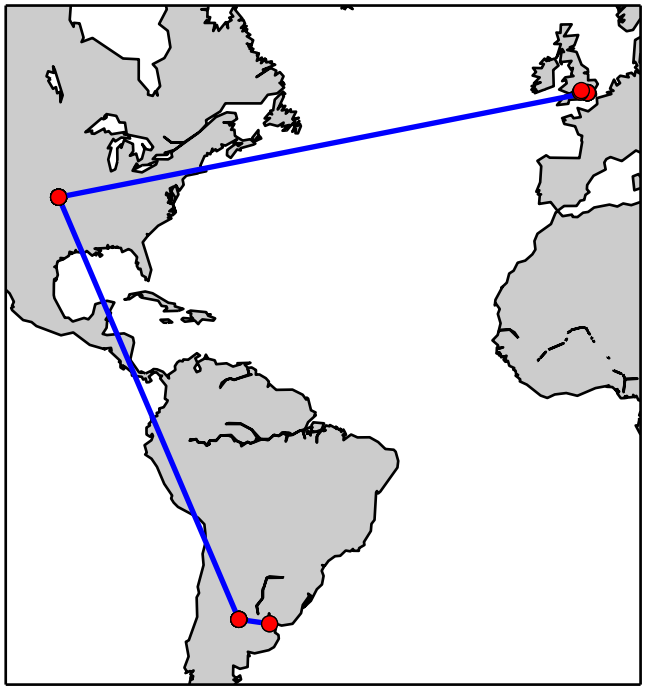
Pendiente.

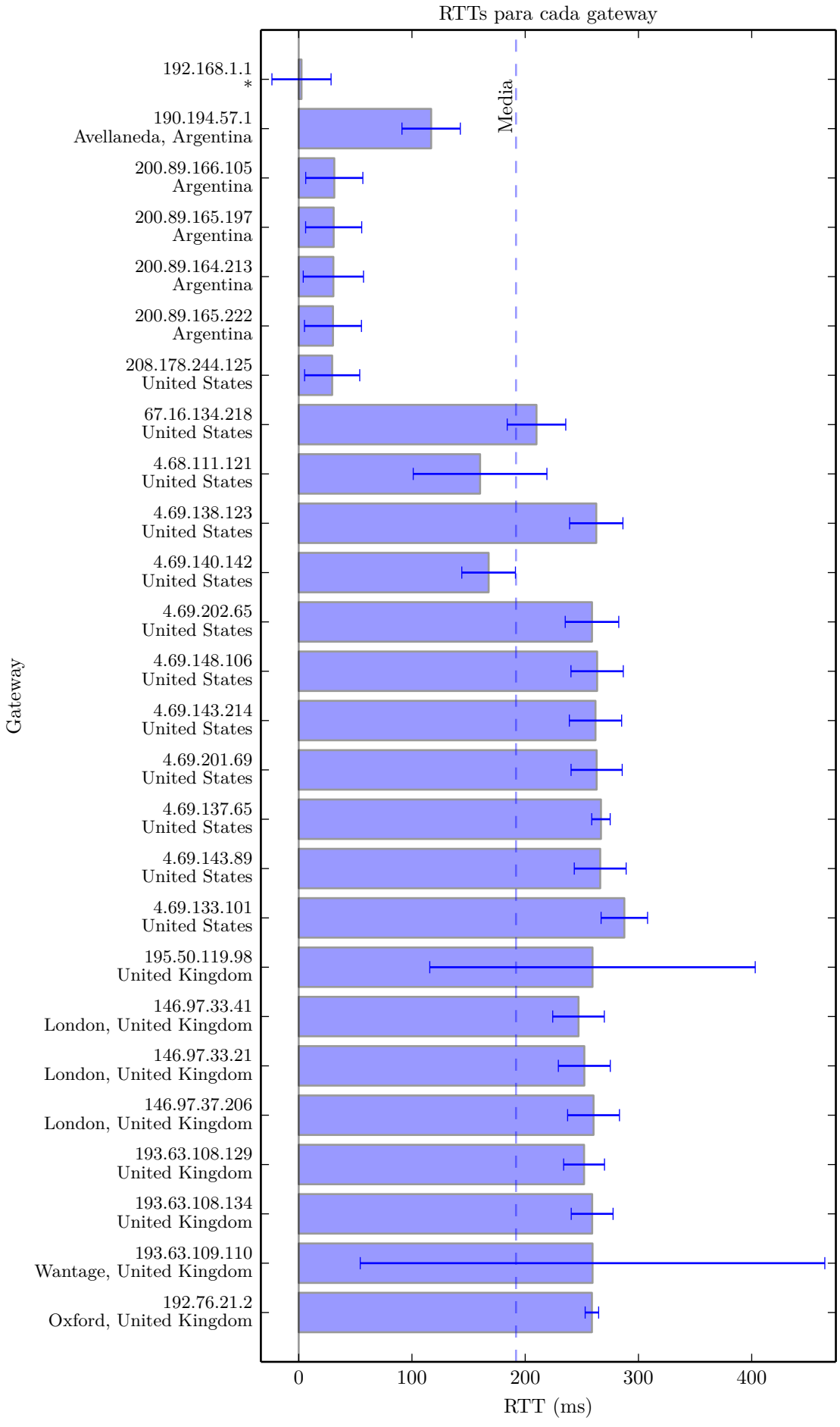
3. Resultados

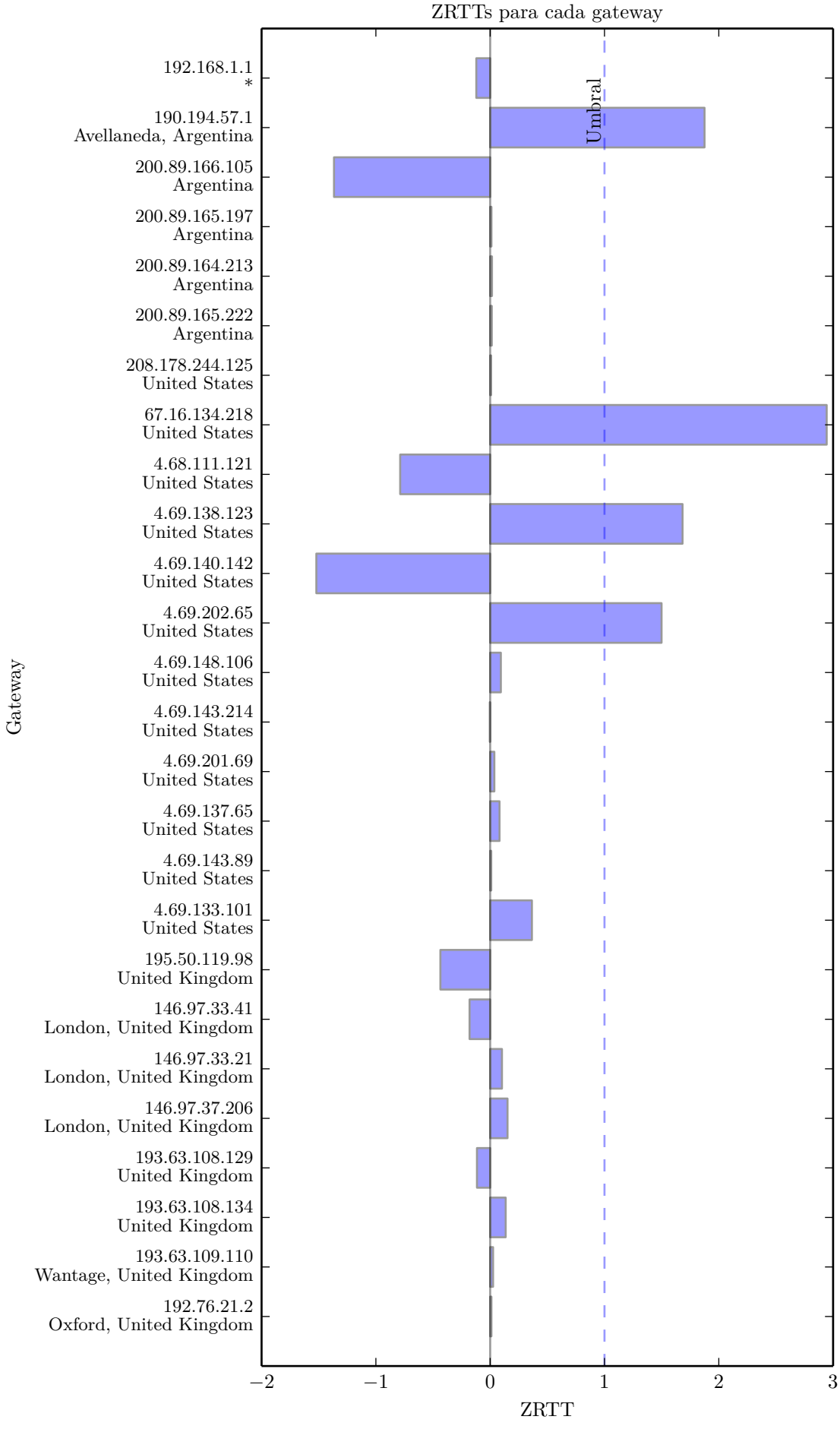
3.1. University of Oxford

TTL	IP Addresses	Absolute RTT	Relative RTT	Relative ZRTT	Location
1	192.168.1.1	2.467 ms	2.467 ms	-0.121	*
2	190.194.57.1	116.937 ms	114.470 ms	1.875	Avellaneda, Argentina
5	200.89.166.105	31.413 ms	-85.525 ms	-1.366	Argentina
6	200.89.165.197	30.870 ms	-0.543 ms	0.011	Argentina
9	200.89.164.213	30.612 ms	-0.258 ms	0.016	Argentina
10	200.89.165.222	30.258 ms	-0.354 ms	0.014	Argentina
11	208.178.244.125	29.547 ms	-0.711 ms	0.008	United States
12	67.16.134.218	209.956 ms	180.409 ms	2.944	United States
	67.16.147.134				United States
13	4.68.111.121	160.149 ms	-49.807 ms	-0.787	United States
14	4.69.138.123	262.754 ms	102.604 ms	1.683	United States
15	4.69.140.142	167.694 ms	-95.060 ms	-1.521	United States
16	4.69.202.65	258.969 ms	91.275 ms	1.499	United States
17	4.69.148.106	263.497 ms	4.528 ms	0.093	United States
18	4.69.143.214	262.053 ms	-1.443 ms	-0.004	United States
19	4.69.201.69	263.068 ms	1.015 ms	0.036	United States
20	4.69.137.65	266.883 ms	3.815 ms	0.082	United States
21	4.69.143.89	266.230 ms	-0.653 ms	0.009	United States
22	4.69.133.101	287.524 ms	21.294 ms	0.365	United States
23	195.50.119.98	259.422 ms	-28.102 ms	-0.436	United Kingdom
24	146.97.33.41	247.070 ms	-12.352 ms	-0.180	London, United Kingdom
25	146.97.33.21	252.201 ms	5.131 ms	0.103	London, United Kingdom
26	146.97.37.206	260.330 ms	8.130 ms	0.152	London, United Kingdom
27	193.63.108.129	251.974 ms	-8.356 ms	-0.116	United Kingdom
28	193.63.108.134	259.115 ms	7.141 ms	0.136	United Kingdom
29	193.63.109.110	259.443 ms	0.328 ms	0.025	Wantage, United Kingdom
30	192.76.21.2	258.893 ms	-0.550 ms	0.011	Oxford, United Kingdom

Ruta principal




RTTs para cada gateway
Media
Gateway
192.168.1.1
*
190.194.57.1
Avellaneda, Argentina
200.89.166.105
Argentina
200.89.165.197
Argentina
200.89.164.213
Argentina
200.89.165.222
Argentina
208.178.244.125
United States
67.16.134.218
United States
4.68.111.121
United States
4.69.138.123
United States
4.69.140.142
United States
4.69.202.65
United States
4.69.148.106
United States
4.69.143.214
United States
4.69.201.69
United States
4.69.137.65
United States
4.69.143.89
United States
4.69.133.101
United States
195.50.119.98
United Kingdom
146.97.33.41
London, United Kingdom
146.97.33.21
London, United Kingdom
146.97.37.206
London, United Kingdom
193.63.108.129
United Kingdom
193.63.108.134
United Kingdom
193.63.109.110
Wantage, United Kingdom
192.76.21.2
Oxford, United Kingdom
0
100
200
300
400
RTT (ms)


ZRTTs para cada gateway
Umbral
Gateway
192.168.1.1
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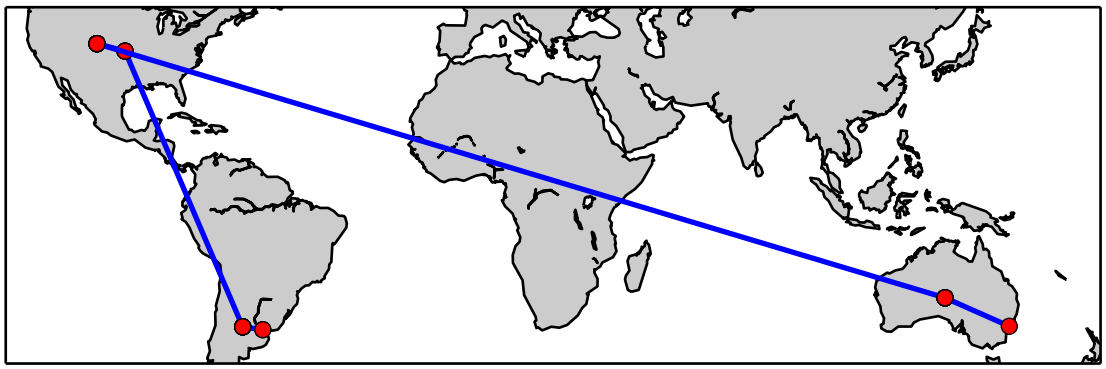
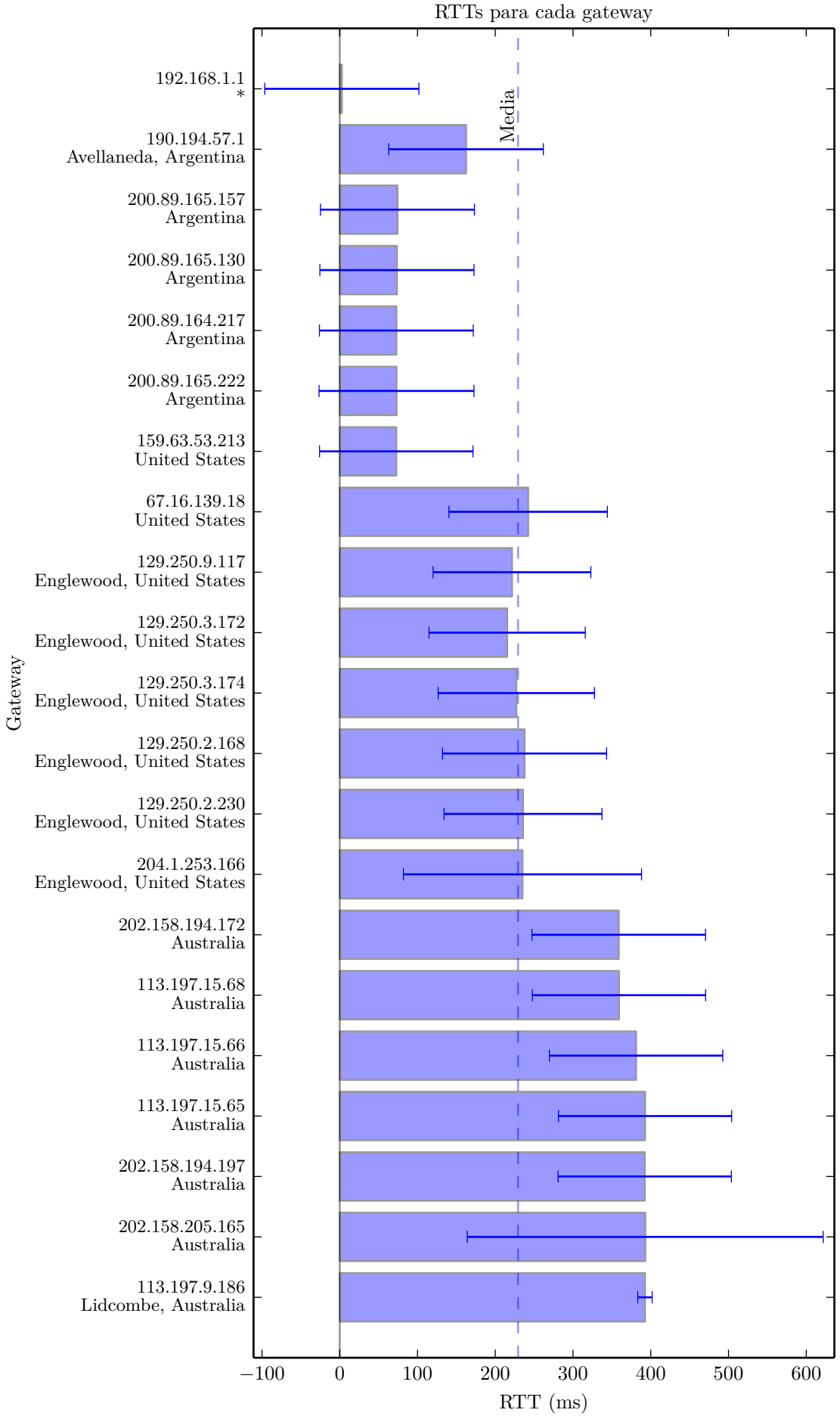
190.194.57.1
Avellaneda, Argentina
200.89.166.105
Argentina
200.89.165.197
Argentina
200.89.164.213
Argentina
200.89.165.222
Argentina
208.178.244.125
United States
67.16.134.218
United States
4.68.111.121
United States
4.69.138.123
United States
4.69.140.142
United States
4.69.202.65
United States
4.69.148.106
United States
4.69.143.214
United States
4.69.201.69
United States
4.69.137.65
United States
4.69.143.89
United States
4.69.133.101
United States
195.50.119.98
United Kingdom
146.97.33.41
London, United Kingdom
146.97.33.21
London, United Kingdom
146.97.37.206
London, United Kingdom
193.63.108.129
United Kingdom
193.63.108.134
United Kingdom
193.63.109.110
Wantage, United Kingdom
192.76.21.2
Oxford, United Kingdom
−2
−1
0
1
2
3
ZRTT

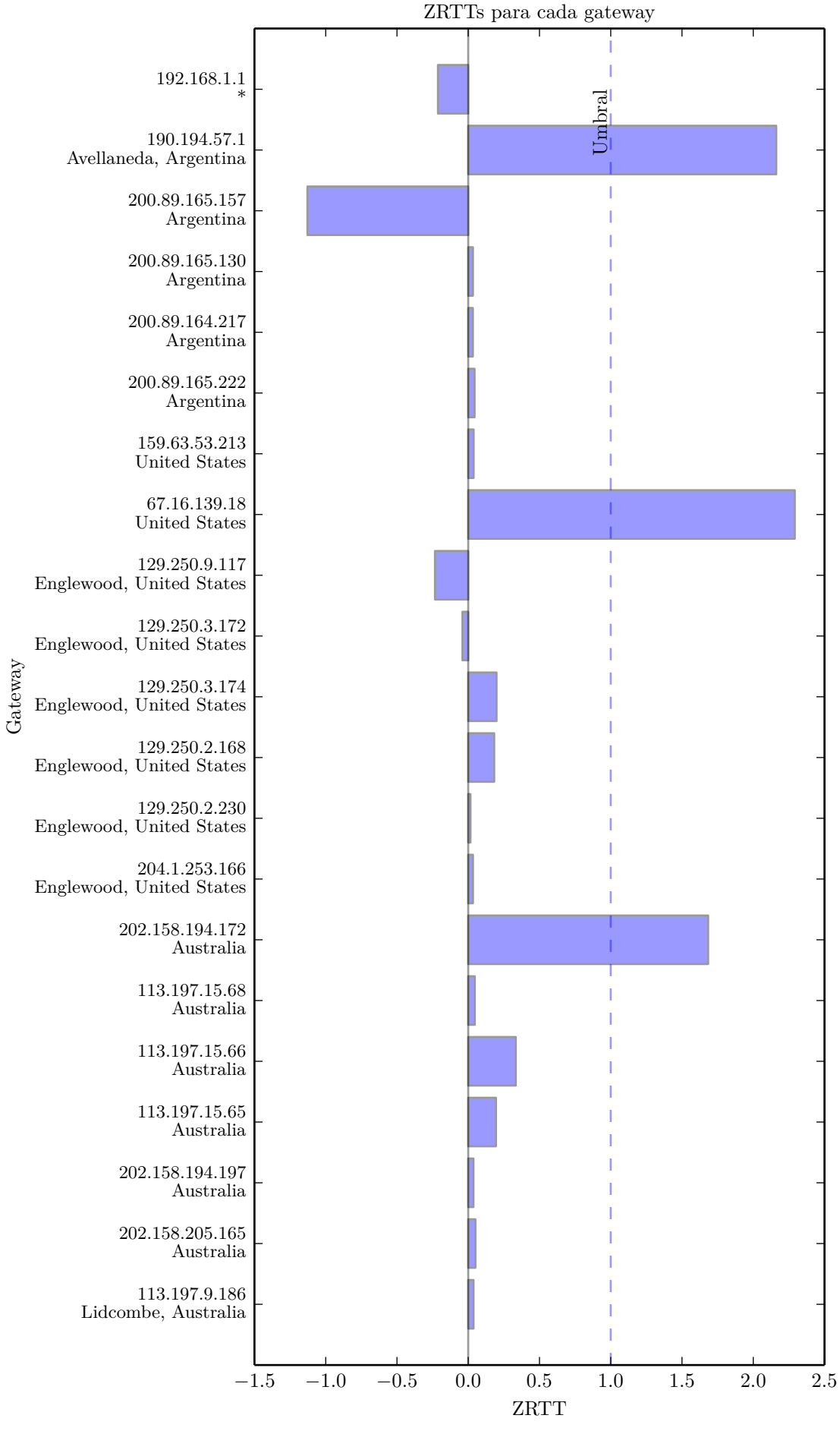
3.2. The University of Sydney

TTL	IP Addresses	Absolute RTT	Relative RTT	Relative ZRTT	Location
1	192.168.1.1	2.672 ms	2.672 ms	-0.212	*
2	190.194.57.1	162.473 ms	159.801 ms	2.162	Avellaneda, Argentina
5	200.89.165.157	74.212 ms	-88.261 ms	-1.128	Argentina
6	200.89.165.130	73.531 ms	-0.681 ms	0.033	Argentina
9	200.89.164.217	72.823 ms	-0.708 ms	0.033	Argentina
10	200.89.165.222	73.014 ms	0.191 ms	0.045	Argentina
11	159.63.53.213	72.701 ms	-0.313 ms	0.038	United States
12	67.16.139.18	242.320 ms	169.619 ms	2.292	United States
13	129.250.9.117	221.543 ms	-20.777 ms	-0.233	Englewood, United States
14	129.250.3.172	215.296 ms	-6.247 ms	-0.041	Englewood, United States
15	129.250.3.174	227.112 ms	11.817 ms	0.199	Englewood, United States
16	129.250.2.168	237.696 ms	10.583 ms	0.183	Englewood, United States
17	129.250.2.230	235.710 ms	-1.985 ms	0.016	Englewood, United States
18	204.1.253.166	235.038 ms	-0.673 ms	0.033	Englewood, United States
19	202.158.194.172	358.811 ms	123.774 ms	1.684	Australia
20	113.197.15.68	359.129 ms	0.318 ms	0.046	Australia
21	113.197.15.66	381.133 ms	22.004 ms	0.334	Australia
22	113.197.15.65	392.658 ms	11.525 ms	0.195	Australia
23	202.158.194.197	392.258 ms	-0.400 ms	0.037	Australia
24	202.158.205.165	392.901 ms	0.643 ms	0.051	Australia
25	113.197.9.186	392.537 ms	-0.364 ms	0.037	Lidcombe, Australia

Ruta principal




RTTs para cada gateway
Media
Gateway
192.168.1.1
*
190.194.57.1
Avellaneda, Argentina
200.89.165.157
Argentina
200.89.165.130
Argentina
200.89.164.217
Argentina
200.89.165.222
Argentina
159.63.53.213
United States
67.16.139.18
United States
129.250.9.117
Englewood, United States
129.250.3.172
Englewood, United States
129.250.3.174
Englewood, United States
129.250.2.168
Englewood, United States
129.250.2.230
Englewood, United States
204.1.253.166
Englewood, United States
202.158.194.172
Australia
113.197.15.68
Australia
113.197.15.66
Australia
113.197.15.65
Australia
202.158.194.197
Australia
202.158.205.165
Australia
113.197.9.186
Lidcombe, Australia
−100
0
100
200
300
400
500
600
RTT (ms)

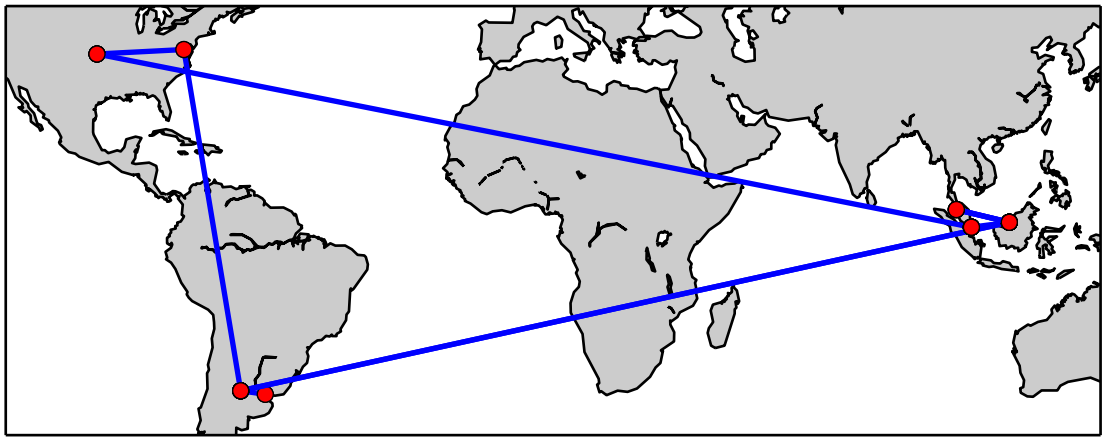

ZRTTs para cada gateway
192.168.1.1
*
190.194.57.1
Avellaneda, Argentina
200.89.165.157
Argentina
200.89.165.130
Argentina
200.89.164.217
Argentina
200.89.165.222
Argentina
159.63.53.213
United States
67.16.139.18
United States
129.250.9.117
Englewood, United States
129.250.3.172
Englewood, United States
129.250.3.174
Englewood, United States
129.250.2.168
Englewood, United States
129.250.2.230
Englewood, United States
204.1.253.166
Englewood, United States
202.158.194.172
Australia
113.197.15.68
Australia
113.197.15.66
Australia
113.197.15.65
Australia
202.158.194.197
Australia
202.158.205.165
Australia
113.197.9.186
Lidcombe, Australia
Gateway
Umbral
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
2.5
ZRTT

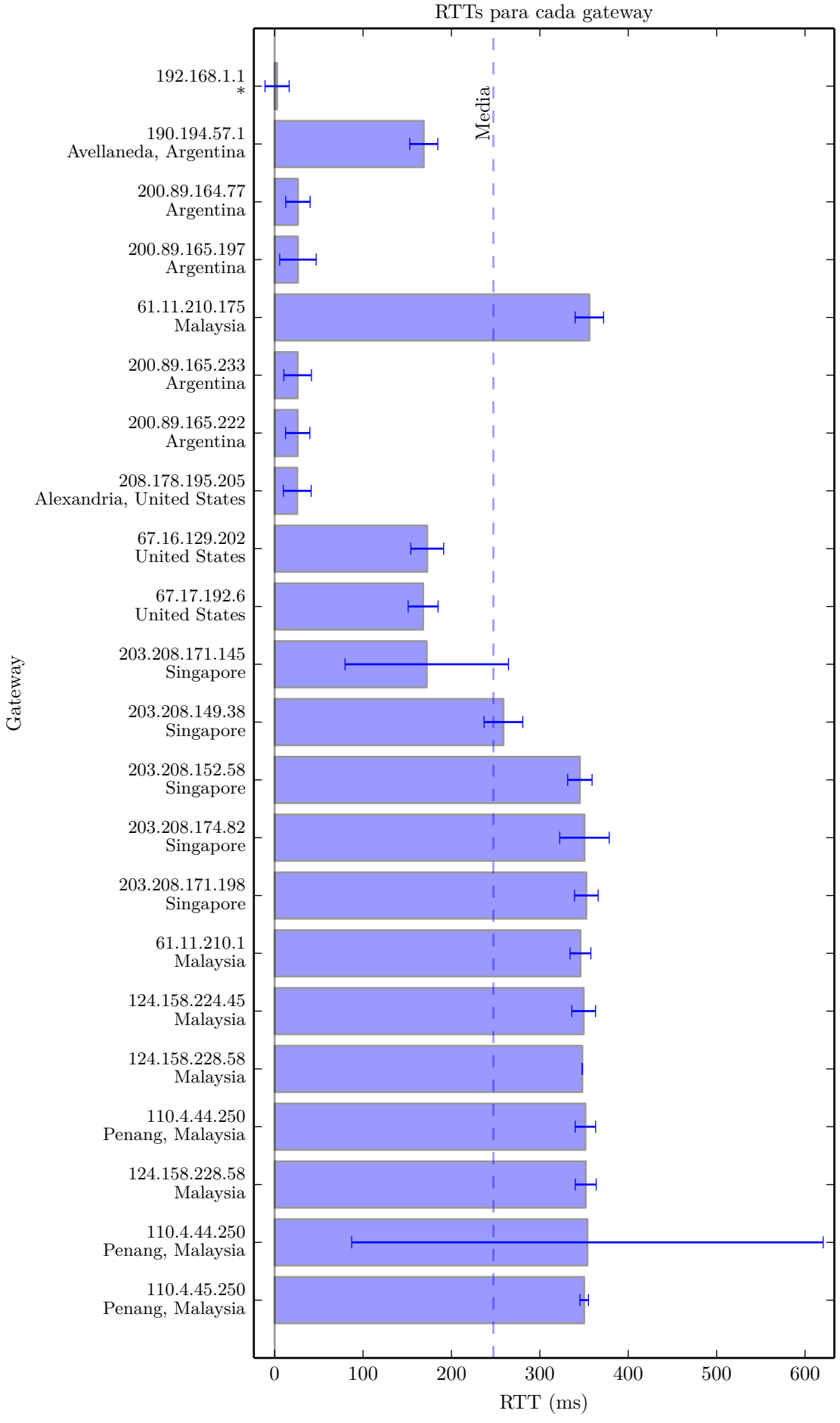
3.3. Malasya University of Science and Technology

TTL	IP Addresses	Absolute RTT	Relative RTT	Relative ZRTT	Location
1	192.168.1.1	2.759 ms	2.759 ms	-0.094	*
2	190.194.57.1	168.634 ms	165.875 ms	1.519	Avellaneda, Argentina
5	200.89.164.77	26.326 ms	-142.308 ms	-1.296	Argentina
6	200.89.165.197	26.331 ms	0.005 ms	0.004	Argentina
	208.178.195.205				Alexandria, United States
8	61.11.210.175	356.019 ms	329.688 ms	3.015	Malaysia
9	200.89.165.233	26.014 ms	-330.005 ms	-3.010	Argentina
10	200.89.165.222	26.049 ms	0.036 ms	0.004	Argentina
11	200.89.165.197	25.579 ms	-0.470 ms	-0.000	Argentina
	208.178.195.205				Alexandria, United States
12	67.16.129.202	172.589 ms	147.010 ms	1.346	United States
13	67.17.192.6	167.939 ms	-4.651 ms	-0.039	United States
14	203.208.171.145	172.060 ms	4.121 ms	0.041	Singapore
15	203.208.151.117	258.795 ms	86.735 ms	0.796	Singapore
	203.208.183.146				Singapore
	203.208.151.113				Singapore
	203.208.149.26				Singapore
	203.208.171.9				Singapore
	203.208.151.229				Singapore
	203.208.149.38				Singapore
	203.208.149.225				Singapore
	203.208.151.85				Singapore
	203.208.154.45				Singapore
	203.208.178.185				Singapore
	203.208.151.221				Singapore
	203.208.171.233				Singapore
	203.208.149.237				Singapore
	203.208.171.189				Singapore
16	203.208.171.137	345.280 ms	86.485 ms	0.794	Singapore
	203.208.152.22				Singapore
	203.208.149.61				Singapore
	203.208.151.194				Singapore
	203.208.182.77				Singapore
	203.208.149.73				Singapore
	203.208.172.101				Singapore
	203.208.182.37				Singapore
	203.208.153.121				Singapore
	203.208.171.85				Singapore
	203.208.171.198				Singapore
	203.208.182.125				Singapore
	203.208.182.41				Singapore
	203.208.152.58				Singapore
17	203.208.174.82	350.498 ms	5.218 ms	0.051	Singapore
	203.208.171.201				Singapore
	203.208.153.253				Singapore
	203.208.183.154				Singapore
	203.208.183.13				Singapore
18	203.208.171.198	352.568 ms	2.070 ms	0.023	Singapore
	124.158.224.45				Malaysia
19	61.11.210.1	345.925 ms	-6.643 ms	-0.057	Malaysia
	203.208.174.82				Singapore
20	61.11.210.175	349.564 ms	3.639 ms	0.037	Malaysia
	124.158.224.45				Malaysia
21	124.158.228.58	348.006 ms	-1.558 ms	-0.010	Malaysia
	61.11.210.1				Malaysia

22	61.11.210.175	351.526 ms	3.520 ms	0.036	Malaysia
	110.4.44.250				Penang, Malaysia
23	124.158.228.58	351.928 ms	0.402 ms	0.008	Malaysia
	110.4.45.250				Penang, Malaysia
24	110.4.45.250	353.841 ms	1.913 ms	0.021	Penang, Malaysia
	110.4.44.250				Penang, Malaysia
25	110.4.45.250	350.132 ms	-3.709 ms	-0.030	Penang, Malaysia

Ruta principal




RTTs para cada gateway
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190.194.57.1
Avellaneda, Argentina
200.89.164.77
Argentina
200.89.165.197
Argentina
61.11.210.175
Malaysia
200.89.165.233
Argentina
200.89.165.222
Argentina
208.178.195.205
Alexandria, United States
67.16.129.202
United States
67.17.192.6
United States
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Singapore
203.208.149.38
Singapore
203.208.152.58
Singapore
203.208.174.82
Singapore
203.208.171.198
Singapore
61.11.210.1
Malaysia
124.158.224.45
Malaysia
124.158.228.58
Malaysia
110.4.44.250
Penang, Malaysia
124.158.228.58
Malaysia
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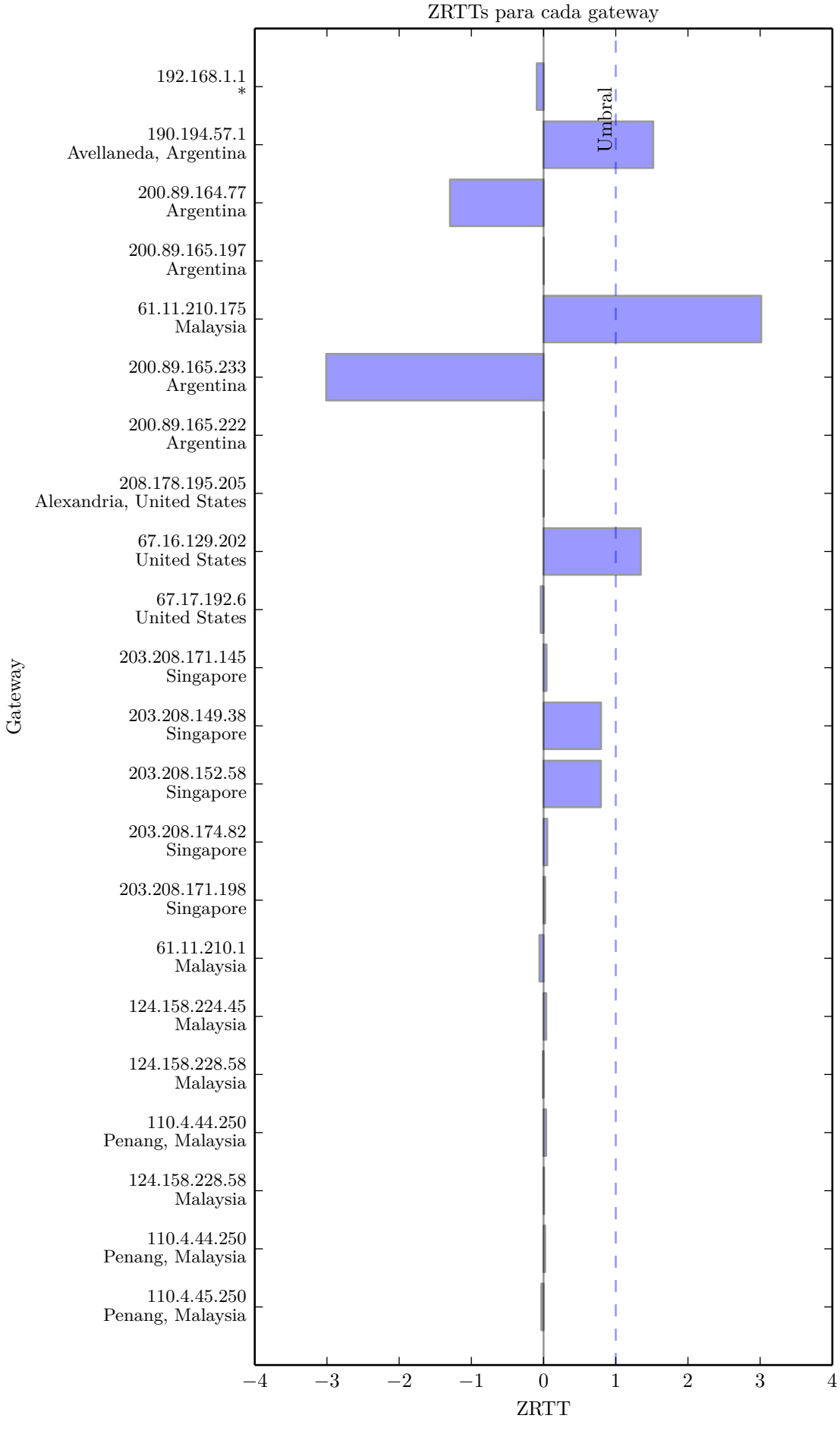
Penang, Malaysia
0
100
200
300
400
500
600
RTT (ms)


ZRTTs para cada gateway
Gateway
192.168.1.1
*
190.194.57.1
Avellaneda, Argentina
200.89.164.77
Argentina
200.89.165.197
Argentina
61.11.210.175
Malaysia
200.89.165.233
Argentina
200.89.165.222
Argentina
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Alexandria, United States
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Singapore
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Malaysia
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Penang, Malaysia
124.158.228.58
Malaysia
110.4.44.250
Penang, Malaysia
110.4.45.250
Penang, Malaysia
Umbral
−4
−3
−2
−1
0
1
2
3
4
ZRTT

4. Discusión

Pendiente.

5. Conclusión

Pendiente.

Referencias

[1] *Scapy Project*. `http://www.secdev.org/projects/scapy`, Mayo de 2014