

Looking for latency clusters in the LAC region

Agustín Formoso
LACNIC Labs
@aguformoso

Pedro Casas
Austrian Institute
for Technology

Nicolás Butler
LACNIC Labs
@Nico_Butler



The project

- Determine connectivity via latency measurements

Some questions

- How is the state of regional connectivity?
- How is Costa Rica connected?
- What is connectivity actually?

About the experiment

- Run ICMP pings
- Indefinitely
- From many origins, to many destinations
- From the Speedchecker platform
- To regional Speedtest servers

Inner latency

- Still countries above 100 ms!
- (**Min** is the most significant value)
- (Filtered output)

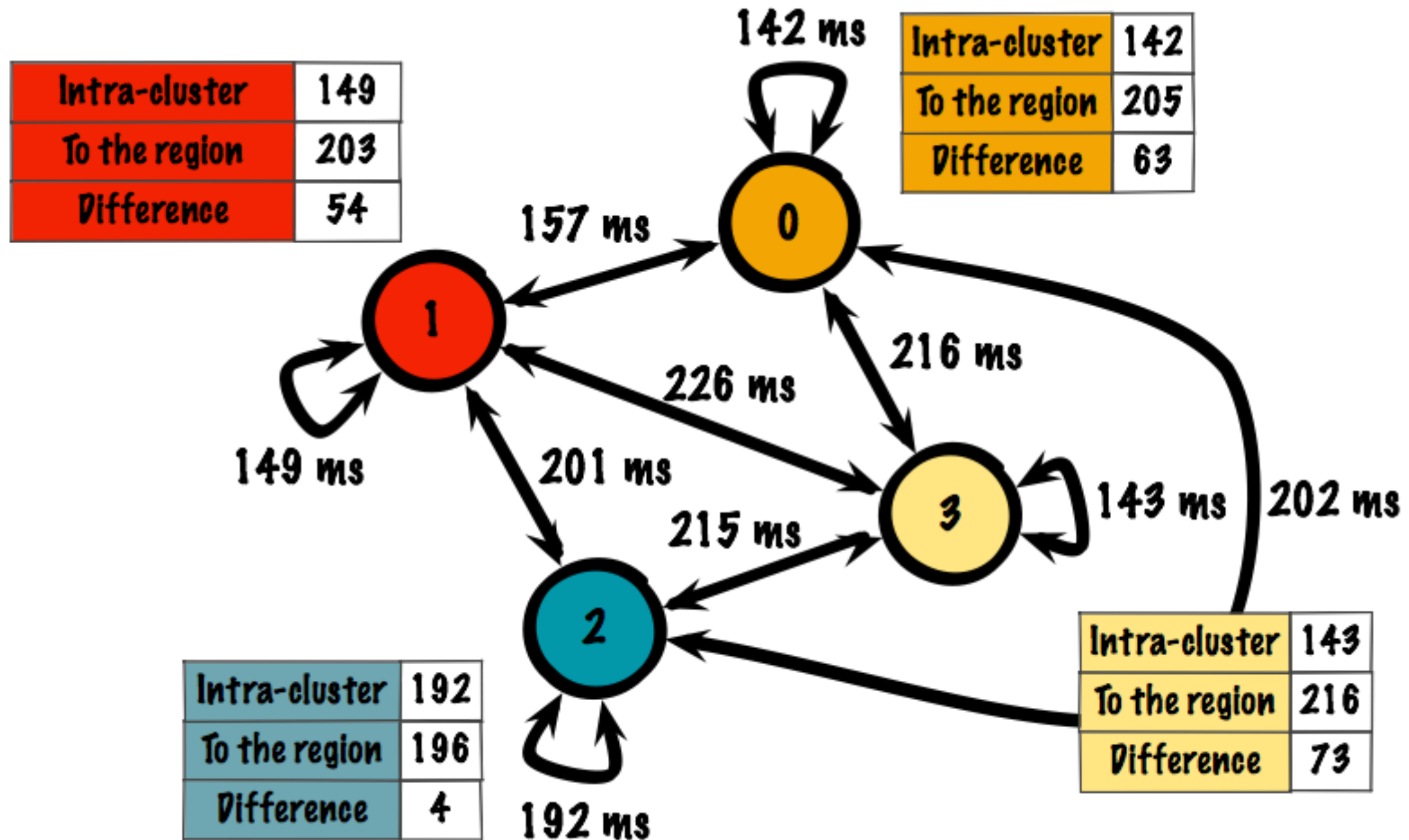
	Min latency (ms)	Samples
SR	168.4	43
VE	142.1	94
BO	118.4	1310
DO	91.1	344
CR 	83.8	238
AR	70.0	6121
PE	66.8	211
BR	65.0	8132
CO	64.6	1003
MX	64.1	3689
HN	55.0	130
SV	53.8	21
GT	53.5	140
TT	45.4	99
EC	43.2	694
HT	36.0	71
GY	29.1	103
PY	23.6	69
CL	22.6	68
PR	18.8	11
UY	11.9	47

Looking for clusters

- 4 regions
- Geographical component
- Logic component (submarine cables)

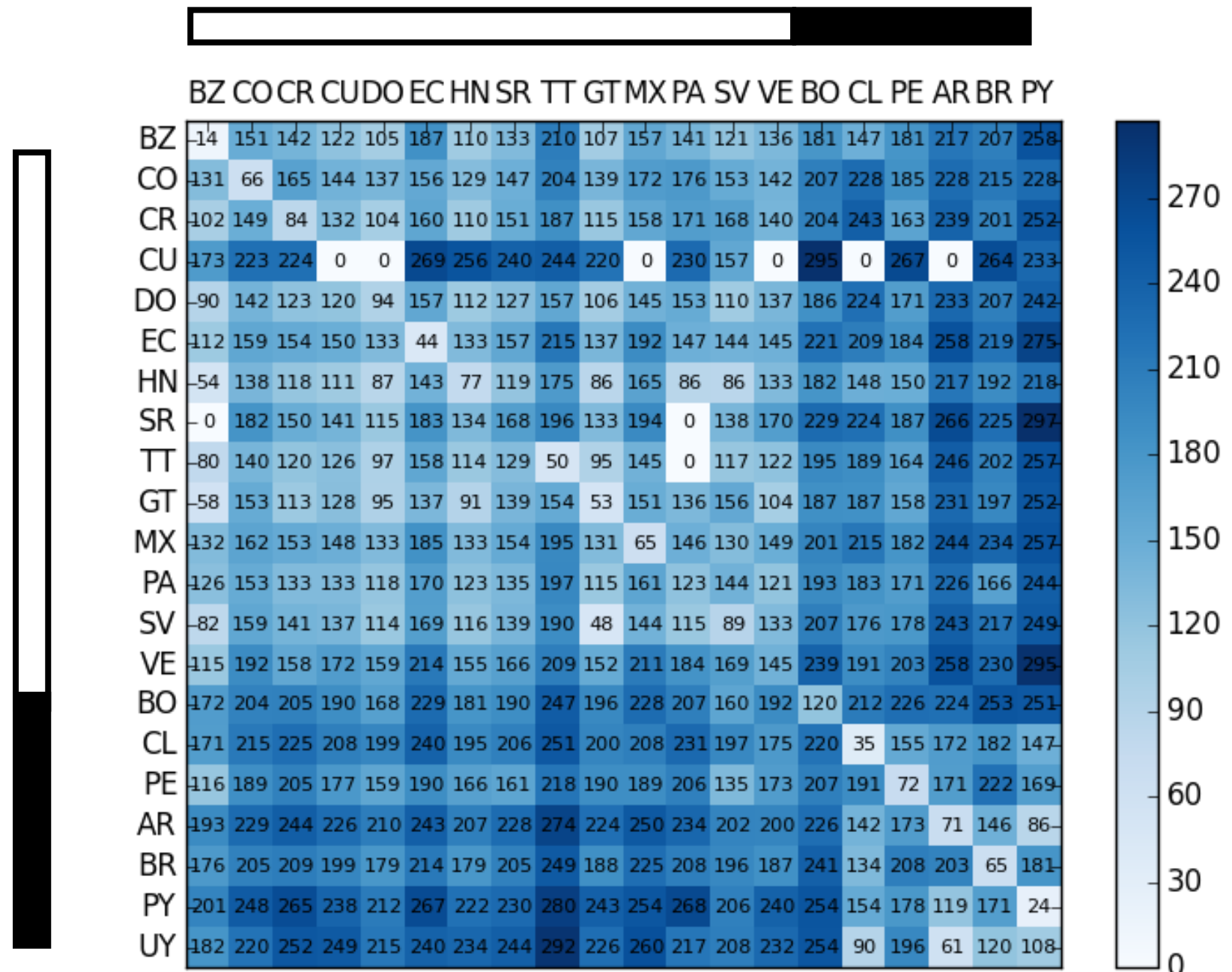


Looking for clusters



ICMP regional matrix (clustered)

- 2 big regions
- Lighter means better connected, darker means worse connected



ICMP regional matrix (clustered)

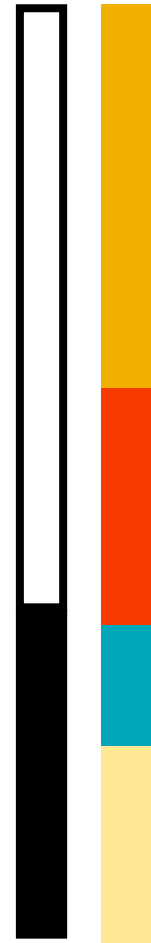
- 2 big regions



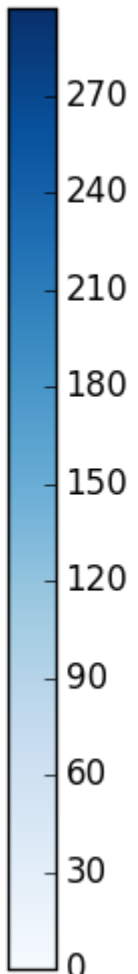
- 4 sub-regions



- Geographical component
- Logic component (submarine cables)



	BZ	CO	CR	CU	DO	EC	HN	SR	TT	GT	MX	PA	SV	VE	BO	CL	PE	AR	BR	PY	UY
BZ	14	151	142	122	105	187	110	133	210	107	157	141	121	136	181	147	181	217	207	258	
CO	131	66	165	144	137	156	129	147	204	139	172	176	153	142	207	228	185	228	215	228	
CR	102	149	84	132	104	160	110	151	187	115	158	171	168	140	204	243	163	239	201	252	
CU	173	223	224	0	0	269	256	240	244	220	0	230	157	0	295	0	267	0	264	233	
DO	90	142	123	120	94	157	112	127	157	106	145	153	110	137	186	224	171	233	207	242	
EC	112	159	154	150	133	44	133	157	215	137	192	147	144	145	221	209	184	258	219	275	
HN	54	138	118	111	87	143	77	119	175	86	165	86	86	133	182	148	150	217	192	218	
SR	0	182	150	141	115	183	134	168	196	133	194	0	138	170	229	224	187	266	225	297	
TT	80	140	120	126	97	158	114	129	50	95	145	0	117	122	195	189	164	246	202	257	
GT	58	153	113	128	95	137	91	139	154	53	151	136	156	104	187	187	158	231	197	252	
MX	132	162	153	148	133	185	133	154	195	131	65	146	130	149	201	215	182	244	234	257	
PA	126	153	133	133	118	170	123	135	197	115	161	123	144	121	193	183	171	226	166	244	
SV	82	159	141	137	114	169	116	139	190	48	144	115	89	133	207	176	178	243	217	249	
VE	115	192	158	172	159	214	155	166	209	152	211	184	169	145	239	191	203	258	230	295	
BO	172	204	205	190	168	229	181	190	247	196	228	207	160	192	120	212	226	224	253	251	
CL	171	215	225	208	199	240	195	206	251	200	208	231	197	175	220	35	155	172	182	147	
PE	116	189	205	177	159	190	166	161	218	190	189	206	135	173	207	191	72	171	222	169	
AR	193	229	244	226	210	243	207	228	274	224	250	234	202	200	226	142	173	71	146	86	
BR	176	205	209	199	179	214	179	205	249	188	225	208	196	187	241	134	208	203	65	181	
PY	201	248	265	238	212	267	222	230	280	243	254	268	206	240	254	154	178	119	171	24	
UY	182	220	252	249	215	240	234	244	292	226	260	217	208	232	254	90	196	61	120	108	



Costa Rica

Region	Latency min (ms)	Samples
Caribbean	129	4583
Central America	182	26609
South America	207	17207

Lowest latencies: DO, HN, GT

Conclusions

- 2 big sub-regions, divided in 4 smaller clusters
 - Still room for improvement
- Costa Rica
 - Poor inner latency (84 ms, 7x the best one)!
 - Well connected to the Caribbean / Central America
- New definition of connectivity (kind of)
 - No single value, but many values (intra and inter-cluster RTTs).

Final notes

- Data collected between June 2015 and June 2016
- Geolocation using Maxmind “Lite” database
- ICMP measurements performed using the Speedchecker platform

Thank you!

Q&A

