



A practical comparison between RIPE Atlas and ProbeAPI

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Outline

- Introduction
- Hardware (Atlas) vs. Software Probes (ProbeAPI)
- Coverage
- Measurements (ICMP)
- Conclusion
- Questions?



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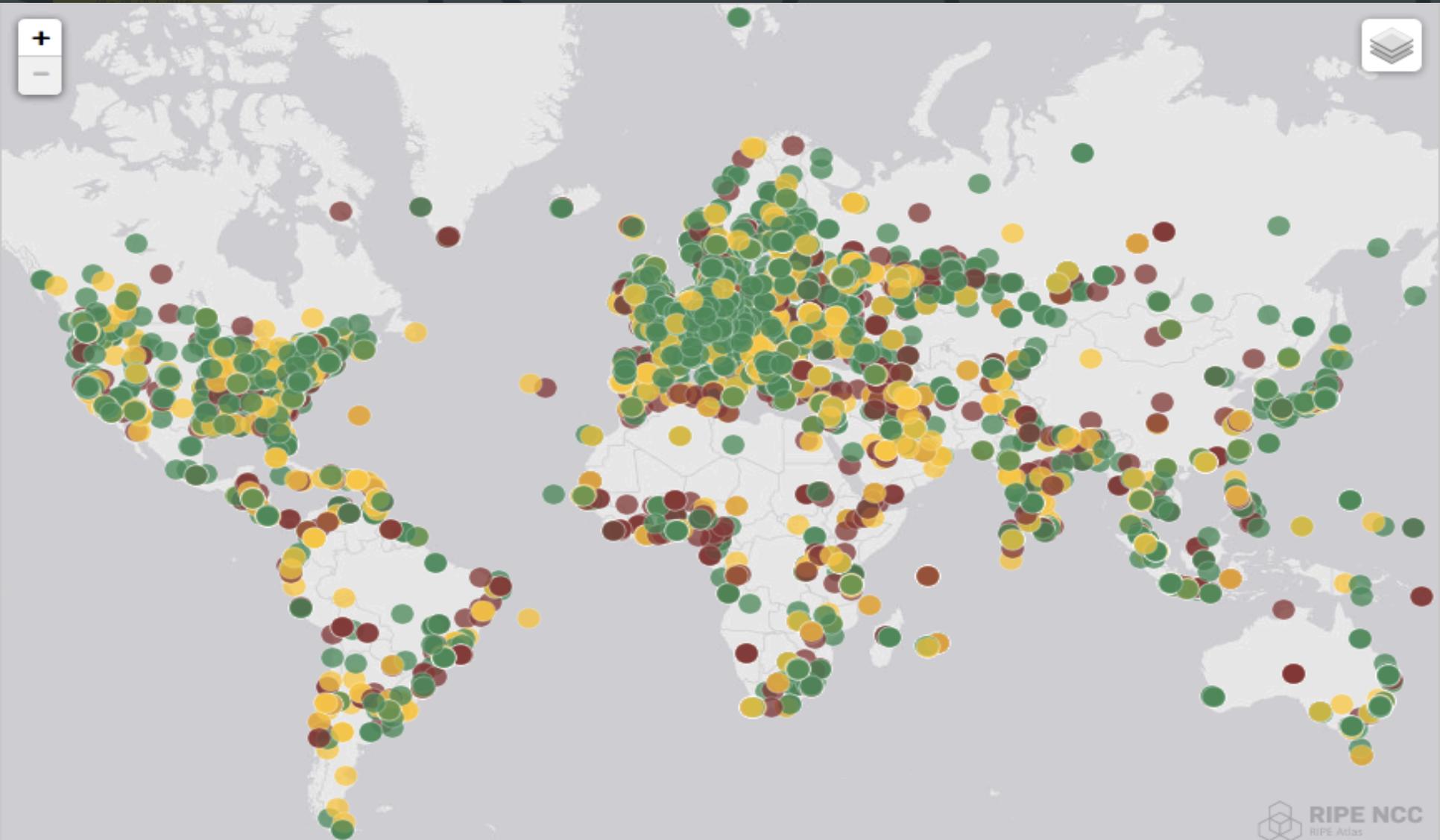
Atlas

- Hardware is homogeneous and therefore it has a more predictable behaviour.
- Connections are more stable due to independence from user's hardware.
- Not bound to a host OS and its limitations/vulnerabilities.
- Distribution is more costly and slower. Some regions are really difficult to cover.
- HTTP measurements only available using anchor probes as targets. DNS Available. Measurement methods are limited due to security reasons.

ProbeAPI

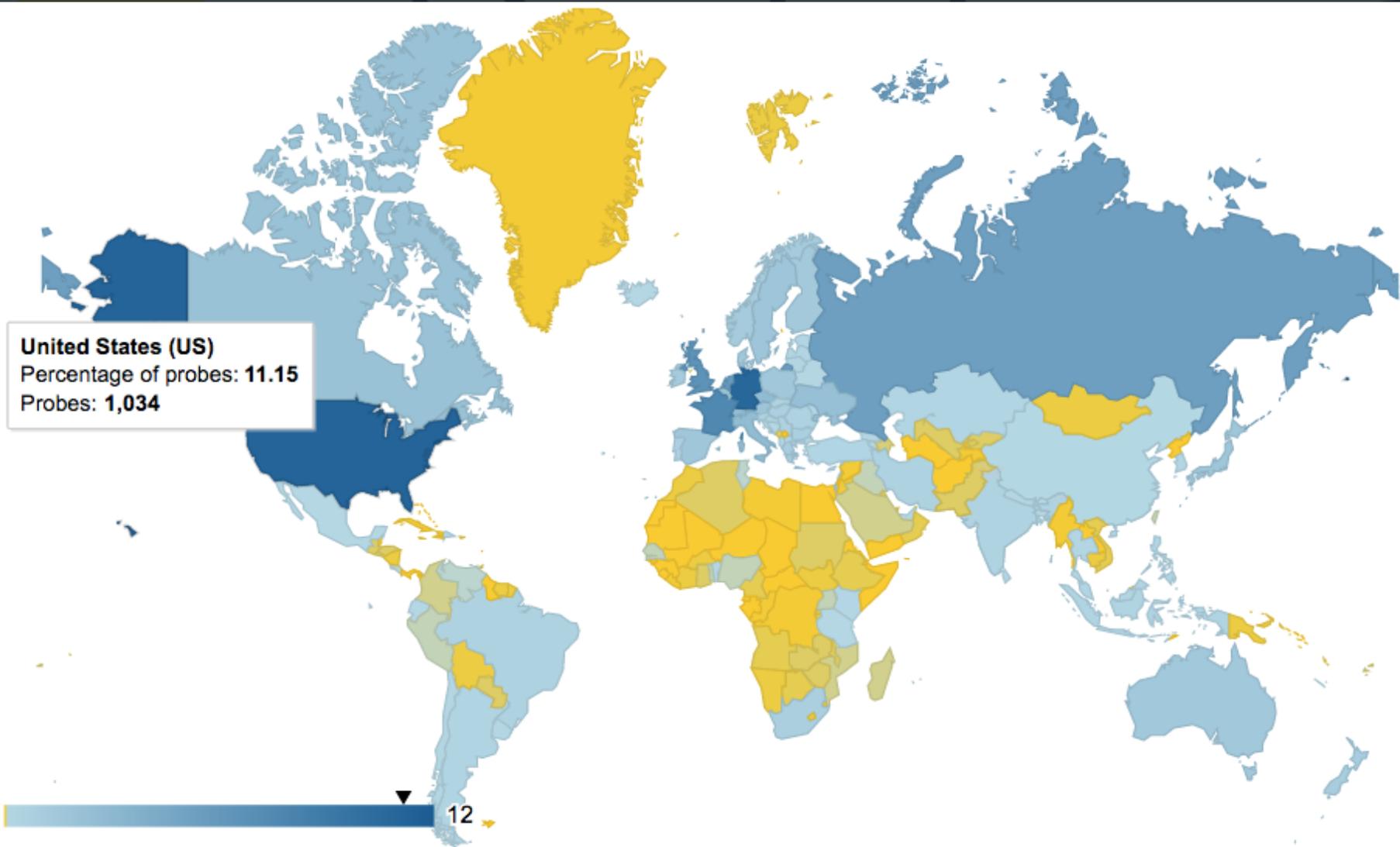
- Hardware is heterogeneous and therefore it has a more unpredictable behaviour.
- Connections are more unstable due to dependence from user's hardware and it's usage.
- Bound to a host OS (Windows) and its limitations/vulnerabilities, but also a good vantage point for application level troubleshooting.
- Distribution is cheaper and faster. Distribution via software has helped to cover otherwise difficult areas.
- HttpGet, DNS and page-load using Chromium libraries are available for any public target.

Coverage – Atlas



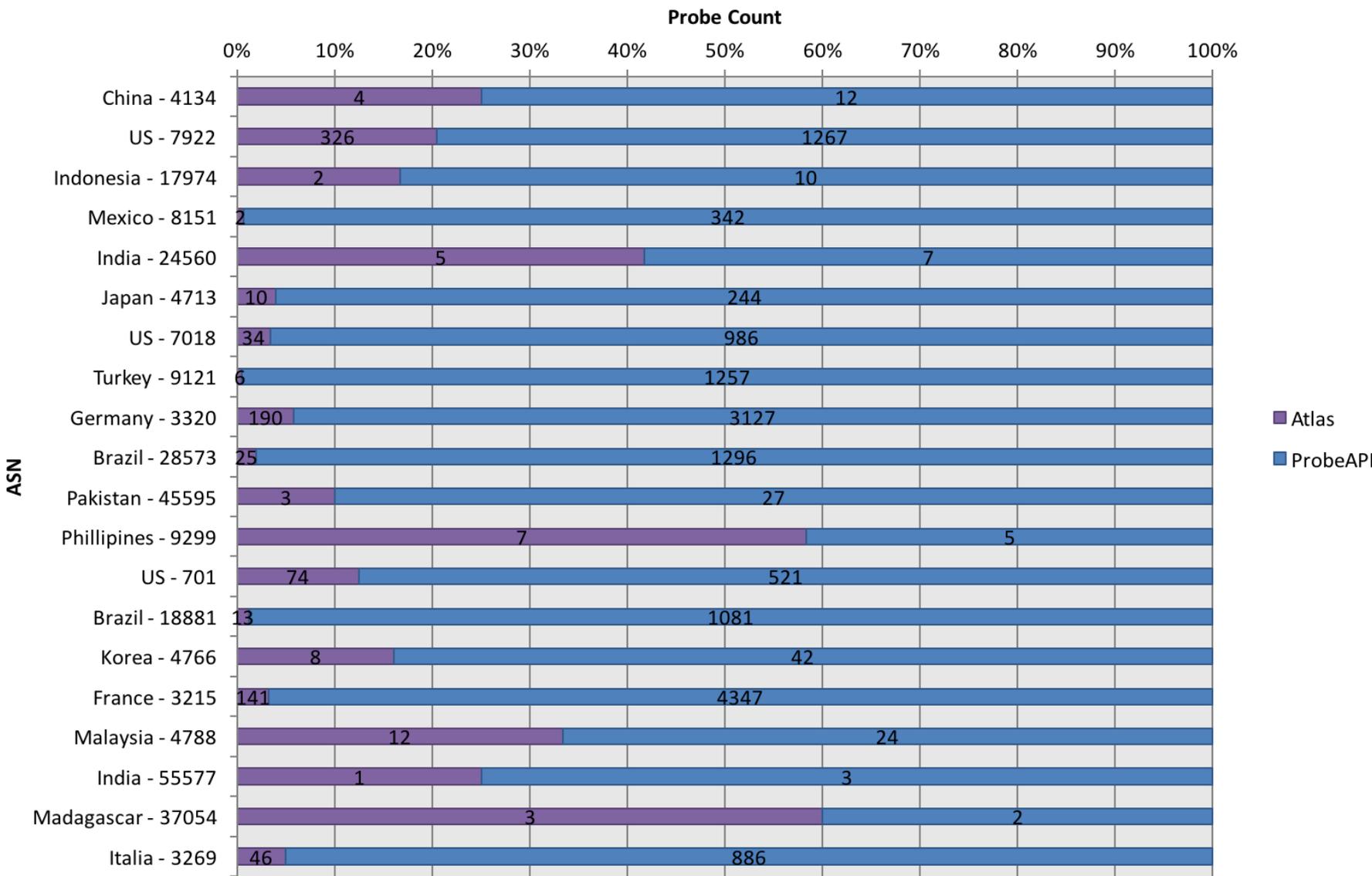
Coverage – Atlas

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Probe Count Atlas & ProbeAPI in top ASNs by # of Users (2015)

Probe Count in Top 20 ASNs covered simultaneously by Atlas and ProbeAPI



Measurements

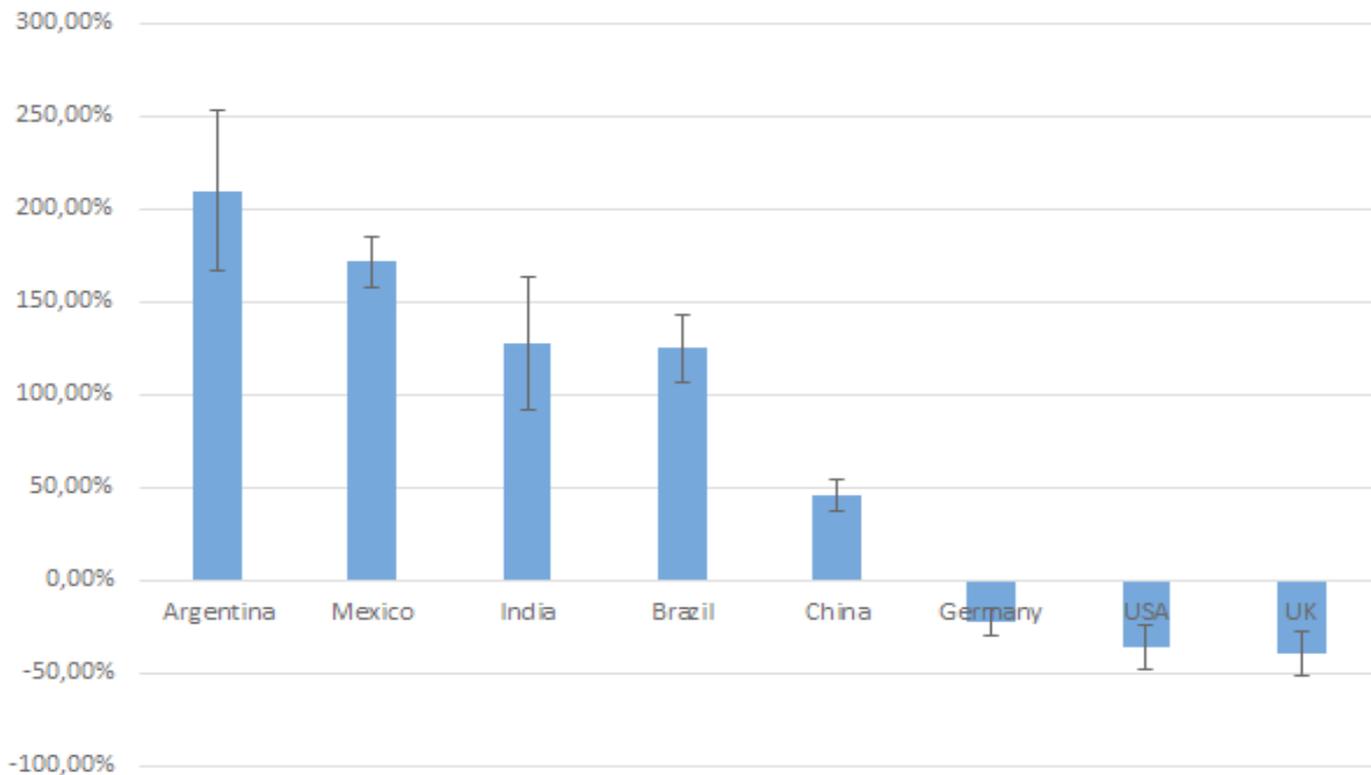
- 1 ICMP measurement per minute repeated 60 times on both platforms simultaneously.
- One country at a time.
- 15 Probes per measurement for Atlas
- 25 Probes per measurement for ProbeAPI. (Higher probe volatility requires more requests to get a comparable number of valid results each time)
- 10% of slowest results were discarded on both platforms.



Results

Countries	Average Difference	Std.Dev.
Japan	1179,59%	269,96%
Argentina	209,82%	86,84%
Mexico	171,66%	27,35%
India	127,64%	70,65%
Brazil	125,17%	36,38%
China	46,15%	17,45%
Germany	-22,42%	14,60%
USA	-35,84%	23,64%
UK	-39,43%	23,93%

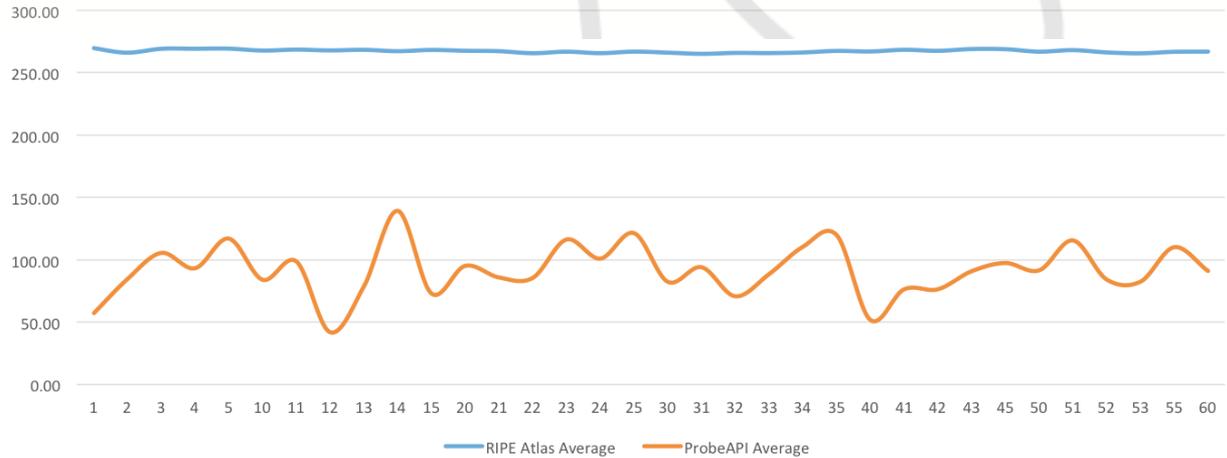
Average Difference in ICMP measurements
ATLAS vs ProbeAPI by Country



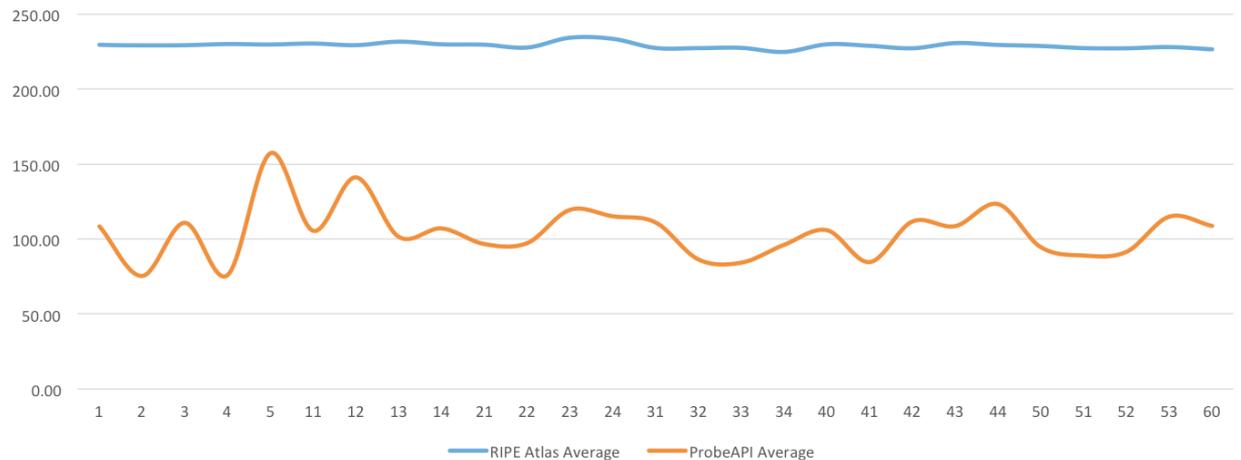
Results

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ICMP Measurements (ms) over 1h Argentina



ICMP Measurements (ms) over 1h Brazil



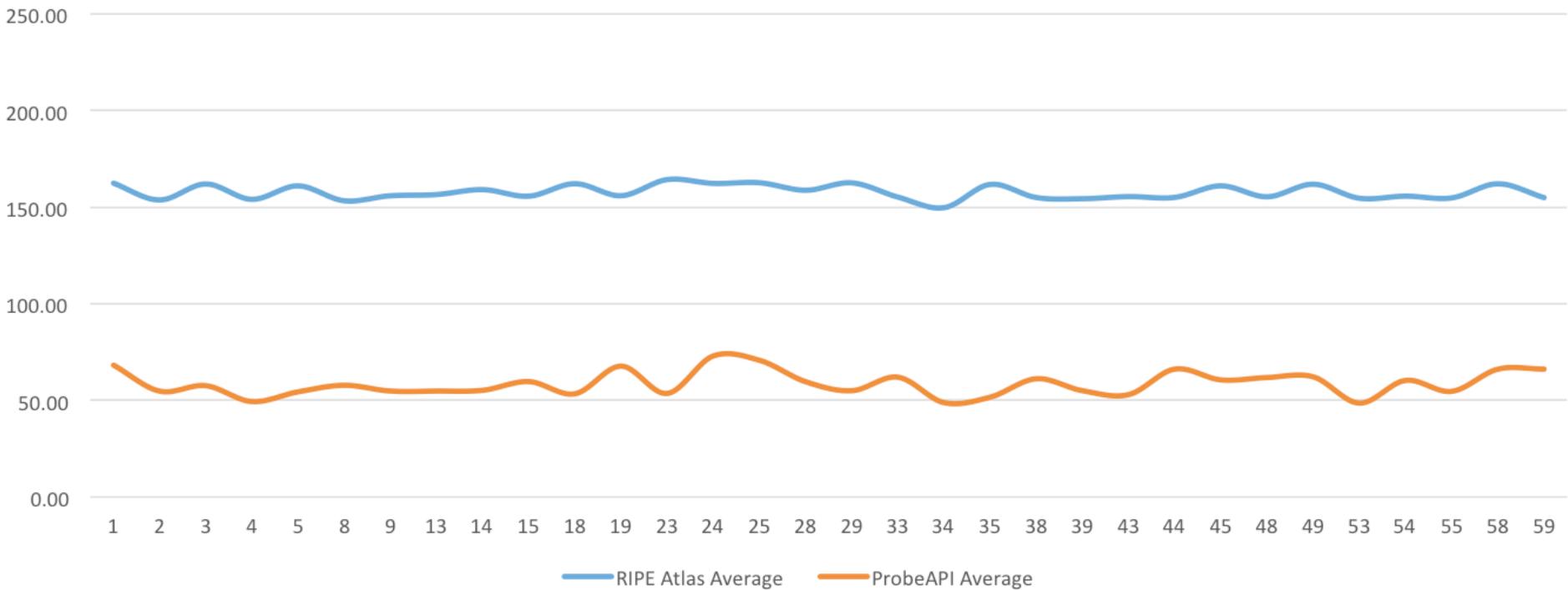


Results

RIPE



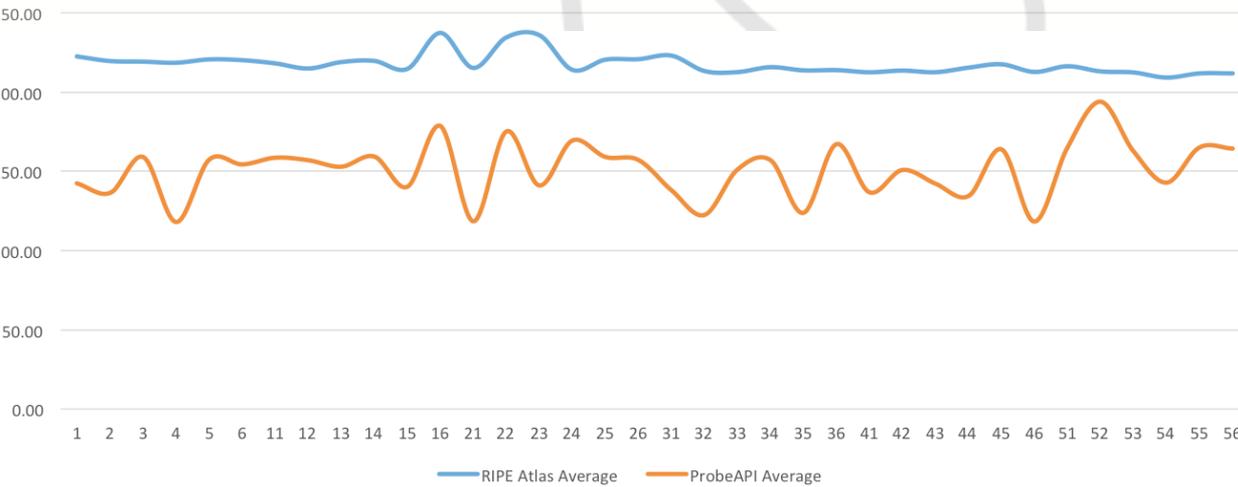
ICMP Measurements (ms) over 1h Mexico



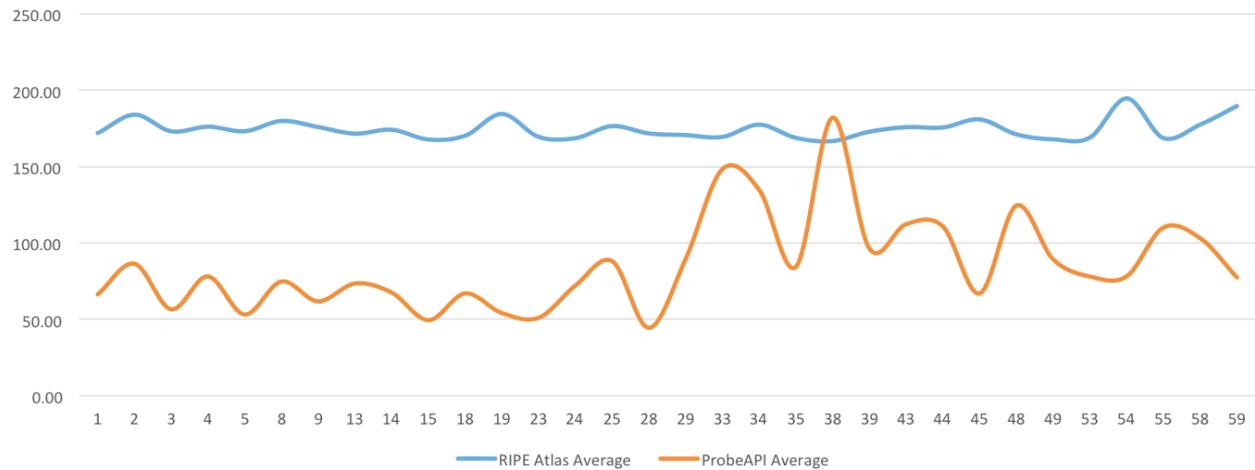
Results

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ICMP Measurements over 1h China



ICMP Measurements (ms) over 1h India



Select probes by

Country

ASN

Country

Japan

Destination

www.microsoft.com

Number of tests

60

Seconds between tests

60

Number of probes for RIPE Atlas

15

Number of probes for ProbeAPI

25

Tests started

Results

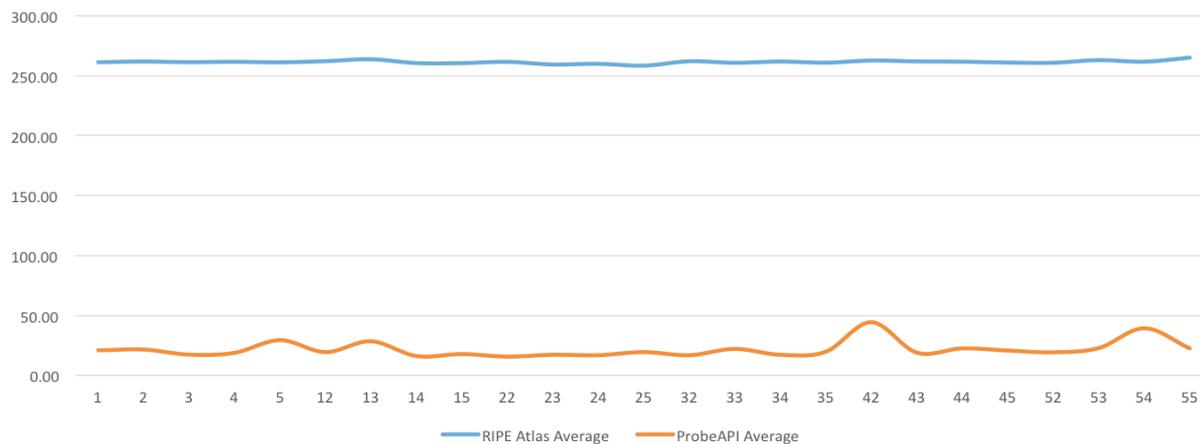
(wave #44) Results from both APIs have been recieved

Stop test

- 184. (wave #43) Results from both APIs have been recieved
- 185. (wave #44) Recieved results from ProbeAPI
- 186. (wave #45) Test started
- 187. (wave #44) Recieved results from RIPE Atlas API
- 188. (wave #44) Results from both APIs have been recieved

#	RIPE Atlas				ProbeAPI				Diff
	Average	Min	Max	Results count	Average	Min	Max	Results Count	
1	255.92	229.46	273.28	12	17.50	4.00	39.00	14	1362.38%
2	256.72	229.49	273.40	12	13.54	5.00	24.00	13	1796.25%
3	256.22	229.46	273.04	12	18.47	3.00	65.00	15	1287.46%
4	256.43	229.48	273.22	12	12.29	3.00	22.00	14	1987.24%
5	255.74	229.43	273.07	12	12.07	3.00	22.00	14	2018.56%

ICMP Measurements (ms) over 1h
Japan



Select probes by

Country ASN

Country

Japan

Destination

www.speedchecker.co.uk

Number of tests

60

Seconds between tests

60

Number of probes for RIPE Atlas

15

Number of probes for ProbeAPI

25

Tests started

Results

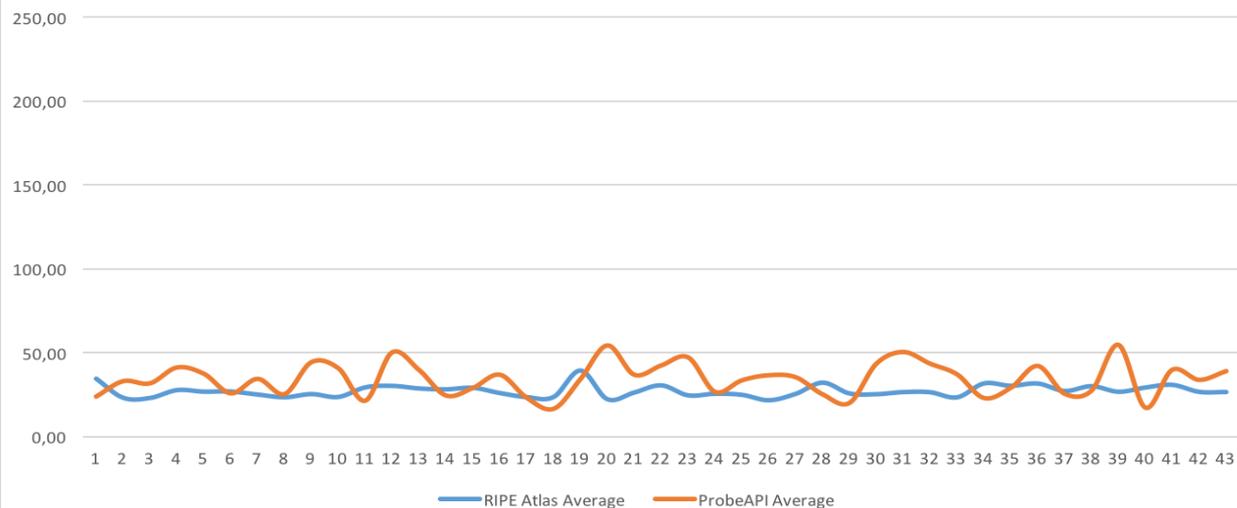
(wave #43) Results from both APIs have been recieved

Stop test

- 180. (wave #42) Results from both APIs have been recieved
- 181. (wave #43) Recieved results from ProbeAPI
- 182. (wave #44) Test started
- 183. (wave #43) Recieved results from RIPE Atlas API
- 184. (wave #43) Results from both APIs have been recieved

#	RIPE Atlas				ProbeAPI				Diff
	Average	Min	Max	Results count	Average	Min	Max	Results Count	
1	34.77	2.78	110.25	12	23.79	5.00	188.00	14	46.19%
2	23.36	6.17	52.47	12	33.00	9.00	75.00	15	-29.20%
3	23.21	1.60	54.81	12	31.73	5.00	69.00	15	-26.87%
4	27.93	3.67	54.99	12	41.19	3.00	101.00	16	-32.20%

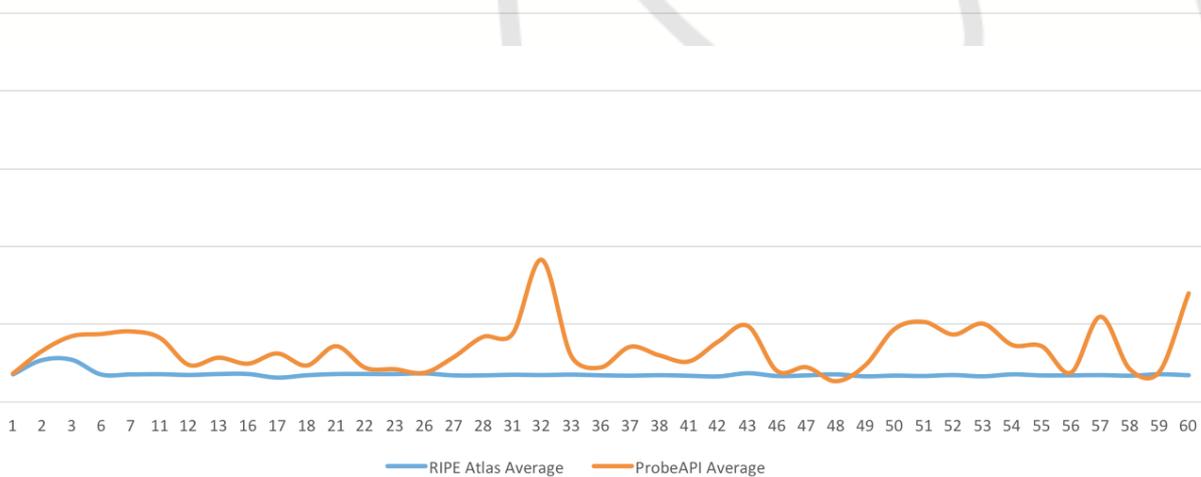
ICMP Measurements (ms) over 1h
Japan



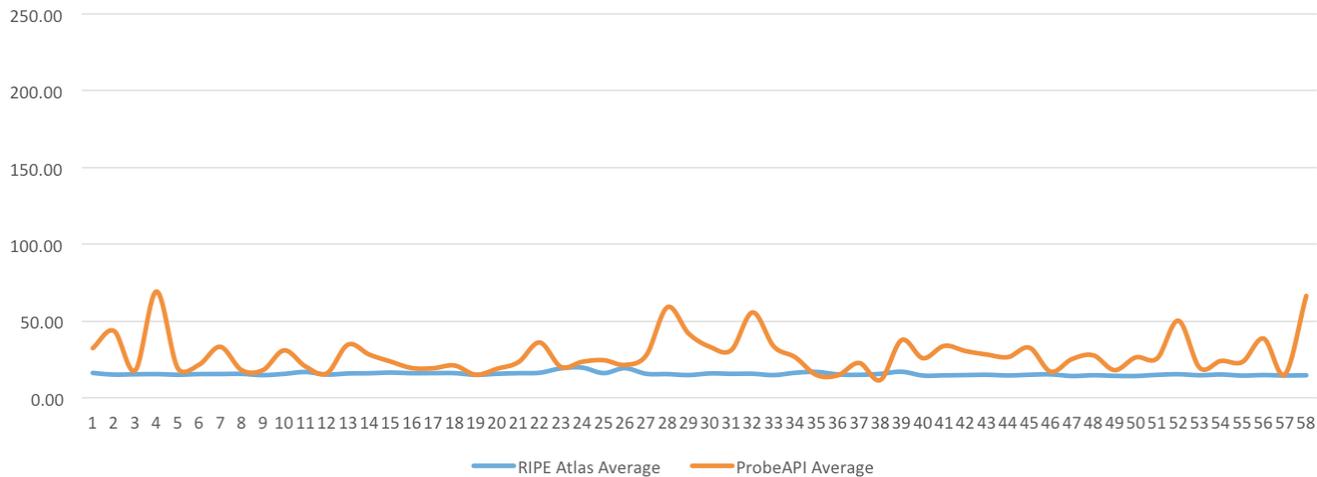
Results

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ICMP Measurements (ms) over 1h United Kingdom



ICMP Measurements (ms) over 1h USA



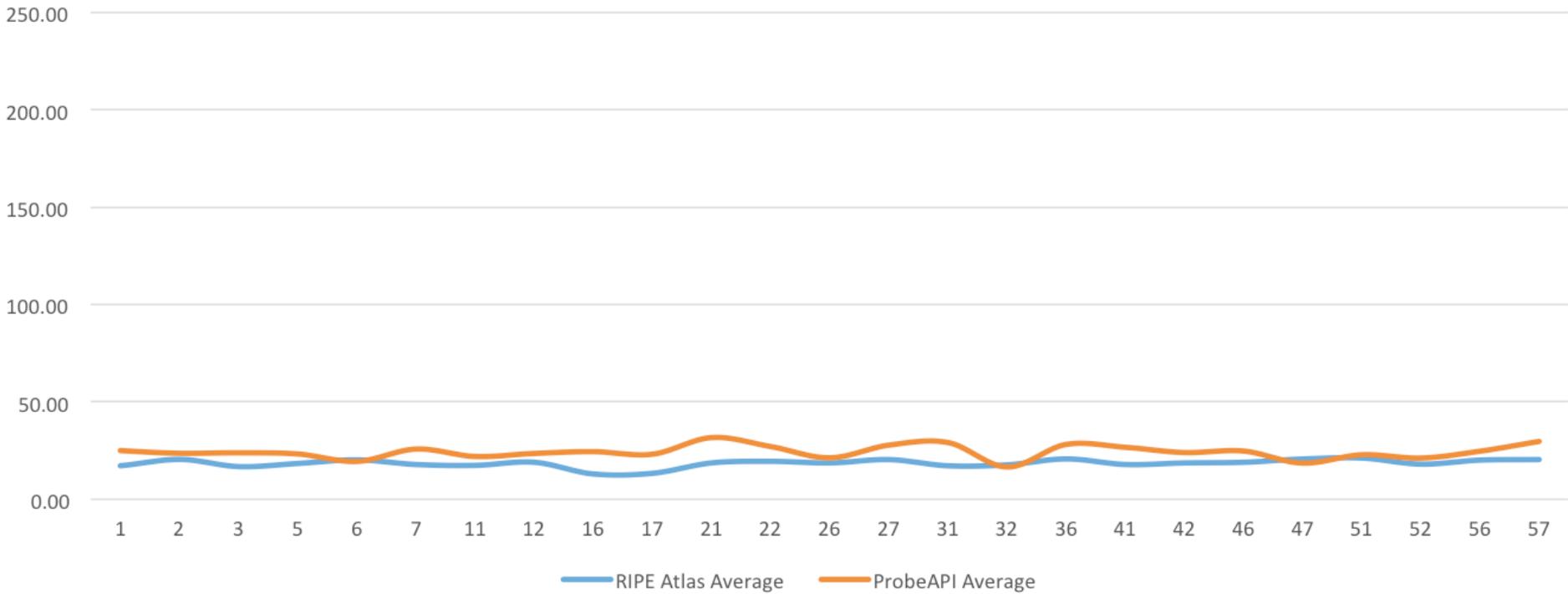


Results

RIPE



ICMP Measurements (ms) over 1h Germany



Comments

- Both platforms perform reliably in well covered areas, such as Germany, USA and UK.
- Software probes deliver relatively unstable results over time, while Hardware probes remain more stable.
- Low coverage affects Software and Hardware probes differently. While hardware probes tend to deliver higher ICMP times, Software probes deliver results with higher variability as well.



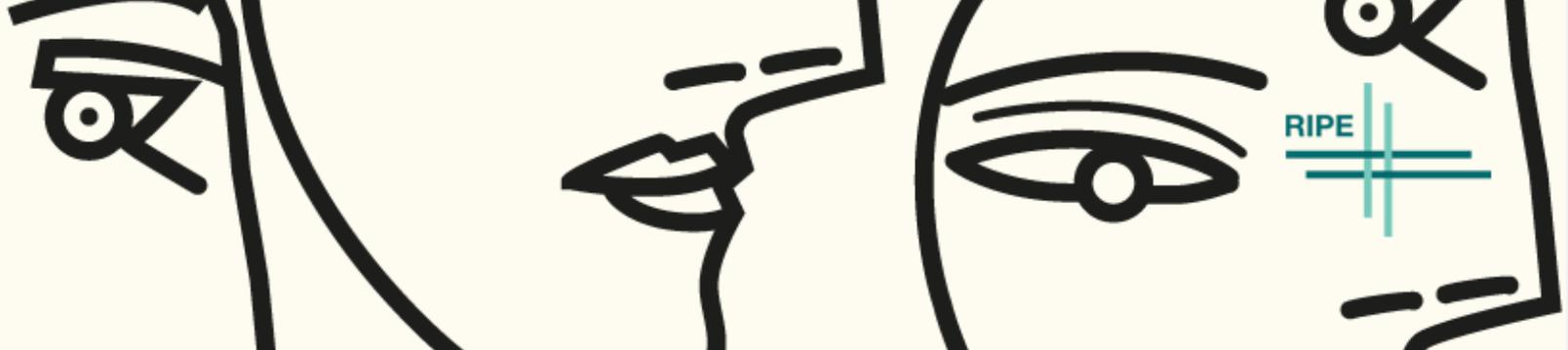
Comments

- Hardware probes seem to be more adequate for base measurements, delivering consequently stable results over time. Therefore smaller fluctuations can be detected with higher precision.
- Software probes offer a good opportunity for measuring areas with low coverage of hardware probes, for ad-hoc measurements, application level insights and troubleshooting. Well covered areas offer reliable base measurement capabilities too.



Links:

- Complete article:
 - https://labs.ripe.net/Members/cristian_varas/a-practical-comparison-between-ripe-atlas-and-probeapi
- Previous Study on Coverage:
 - <http://blog.speedchecker.xyz/2015/10/13/a-study-on-the-coverage-of-probeapi-and-ripe-atlas/>
- Lacnic Study on Connectivity in LAC region:
 - <https://blog.apnic.net/2016/05/03/connectivity-lac-region/>



Thank You! ...Questions?

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PS: Talk to me after the session if you want to run comparative tests on your own sites/endpoints.

