

GLOBAL AND LOCAL LATENCY ANALYSIS



- Sahil Narang & Rohit Gupta

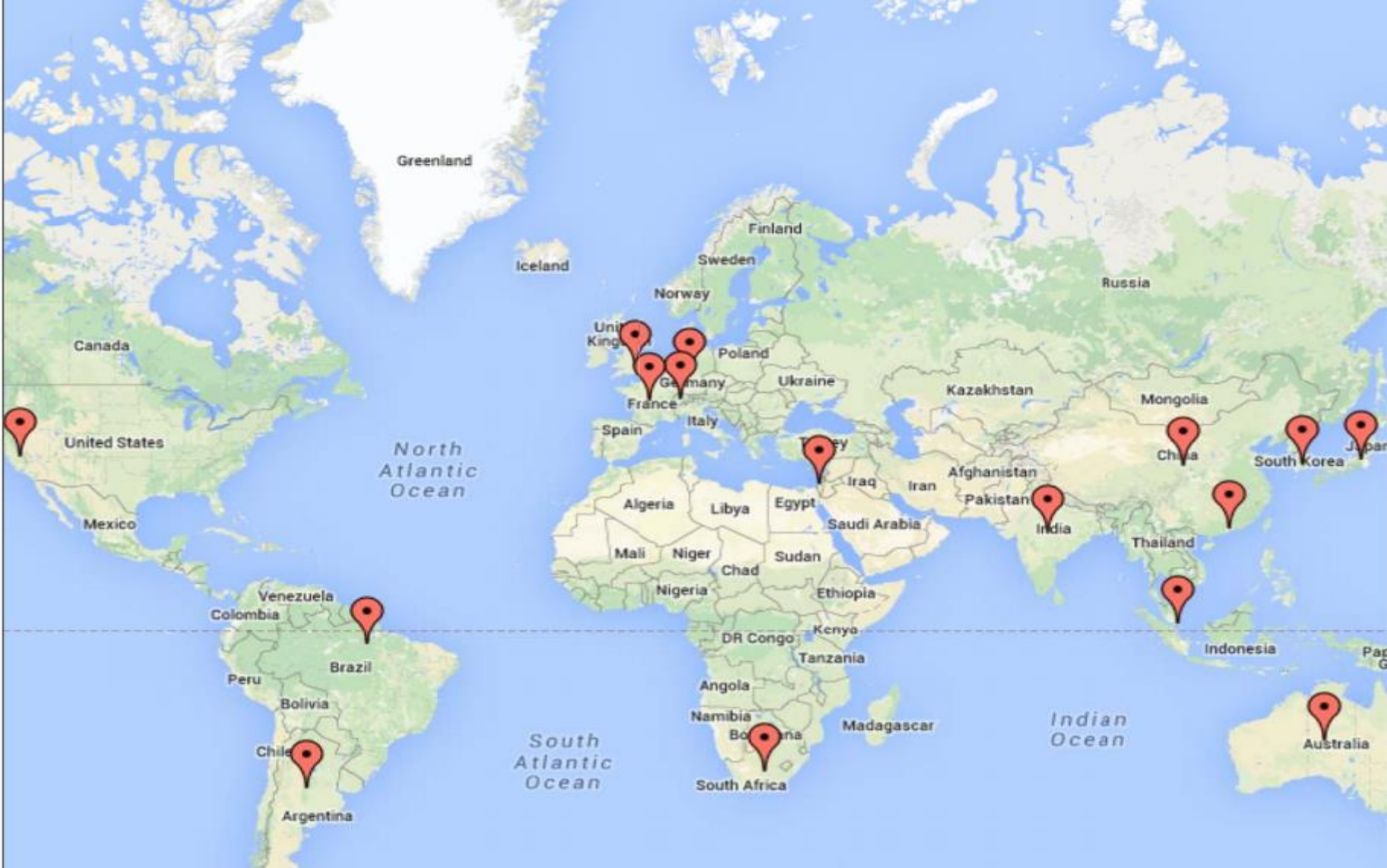
OBJECTIVES

- Measure Average Global and Local Latencies
- Determine variation in latencies w.r.t. time (weekday and weekend)
- Determine variation in latencies w.r.t. distance
- Measure frequency of transatlantic hops in 'local' pings

COLLECTED DATA

- 25 Globally distributed servers
 - Every hour for 17 days = 10200 traces
 - Weekday dataset: 5 days -> 3000 traces
 - Weekend dataset: 5 days -> 3000 traces
- 5 Continental North America servers
 - Every hour for 12 days = 1440 traces

TEST SERVER LOCATIONS



PROCESSED DATA

```
val(:,:,1) =

Columns 1 through 5

'152.2.31.1'      'Chapel Hill'    'North Carolina' 'US'    '5.314'
'152.2.255.209'  'Chapel Hill'    'North Carolina' 'US'    '1.546'
'128.109.1.89'   'Dobson'         'North Carolina' 'US'    '6.340'
'128.109.1.94'   'Dobson'         'North Carolina' 'US'    '9.960'
'4.26.6.193'     'ul'             'ul'             'US'    '13.999'
'4.69.149.16'    'ul'             'ul'             'US'    '15.606'
'4.69.149.208'   'ul'             'ul'             'US'    '25.947'
'216.6.87.65'    'Wilmington'    'Delaware'       'US'    '23.919'
'64.86.252.197'  'Wilmington'    'Delaware'       'US'    '66.790'
'180.87.15.25'   'Pune'           'Maharashtra'    'IN'    '253.779'
                []              []                []      []
                []              []                []      []
                []              []                []      []

Columns 6 through 10

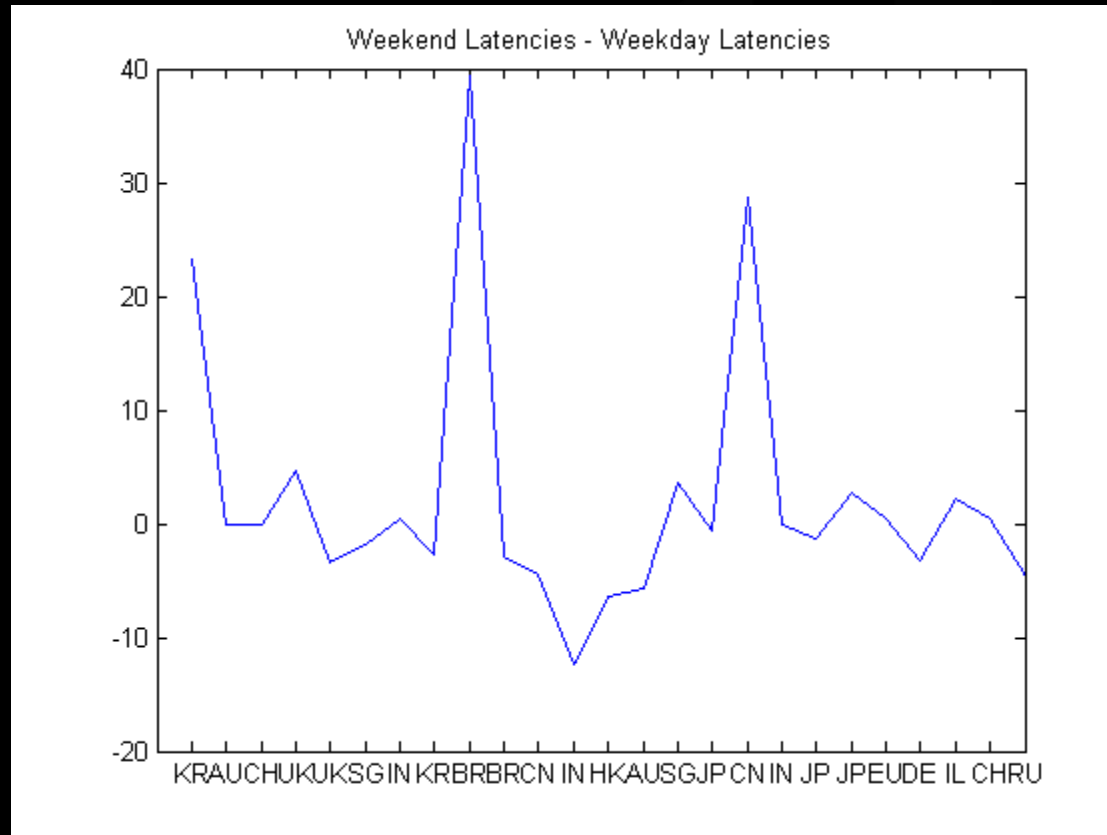
'152.2.31.1'      'Chapel Hill'    'North Carolina' 'US'    '5.319'
'152.2.255.209'  'Chapel Hill'    'North Carolina' 'US'    '1.559'
'128.109.1.89'   'Dobson'         'North Carolina' 'US'    '6.938'
'128.109.1.101'  'Dobson'         'North Carolina' 'US'    '9.843'
'4.26.6.193'     'ul'             'ul'             'US'    '14.531'
'4.69.149.144'   'ul'             'ul'             'US'    '14.815'
'4.69.149.208'   'ul'             'ul'             'US'    '19.452'
'216.6.87.65'    'Wilmington'    'Delaware'       'US'    '23.938'
'64.86.252.197'  'Wilmington'    'Delaware'       'US'    '70.713'
'180.87.15.25'   'Pune'           'Maharashtra'    'IN'    '250.480'
                []              []                []      []
                []              []                []      []
                []              []                []      []

Columns 11 through 15

'152.2.31.1'      'Chapel Hill'    'North Carolina' 'US'    '5.338'
'152.2.255.209'  'Chapel Hill'    'North Carolina' 'US'    '1.561'
'128.109.1.89'   'Dobson'         'North Carolina' 'US'    '6.940'
'128.109.1.101'  'Dobson'         'North Carolina' 'US'    '9.938'
'4.26.6.193'     'ul'             'ul'             'US'    '14.005'
'4.69.149.144'   'ul'             'ul'             'US'    '14.791'
'4.69.149.80'    'ul'             'ul'             'US'    '14.769'
'216.6.87.65'    'Wilmington'    'Delaware'       'US'    '23.921'
'64.86.252.197'  'Wilmington'    'Delaware'       'US'    '71.326'
'180.87.15.25'   'Pune'           'Maharashtra'    'IN'    '245.666'
                []              []                []      []
                []              []                []      []
                []              []                []      []
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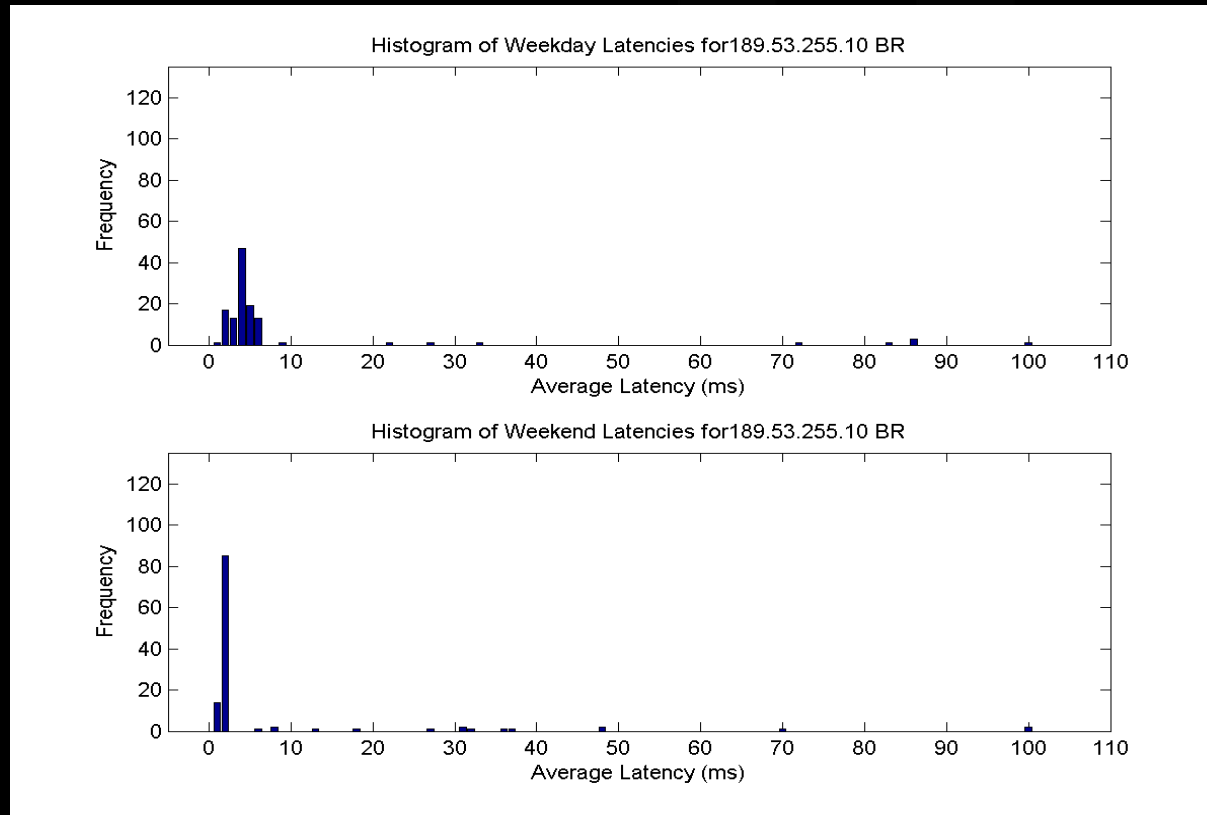
VARIATION IN LATENCY W.R.T. TIME

- No discernable pattern
- Few anomalous cases



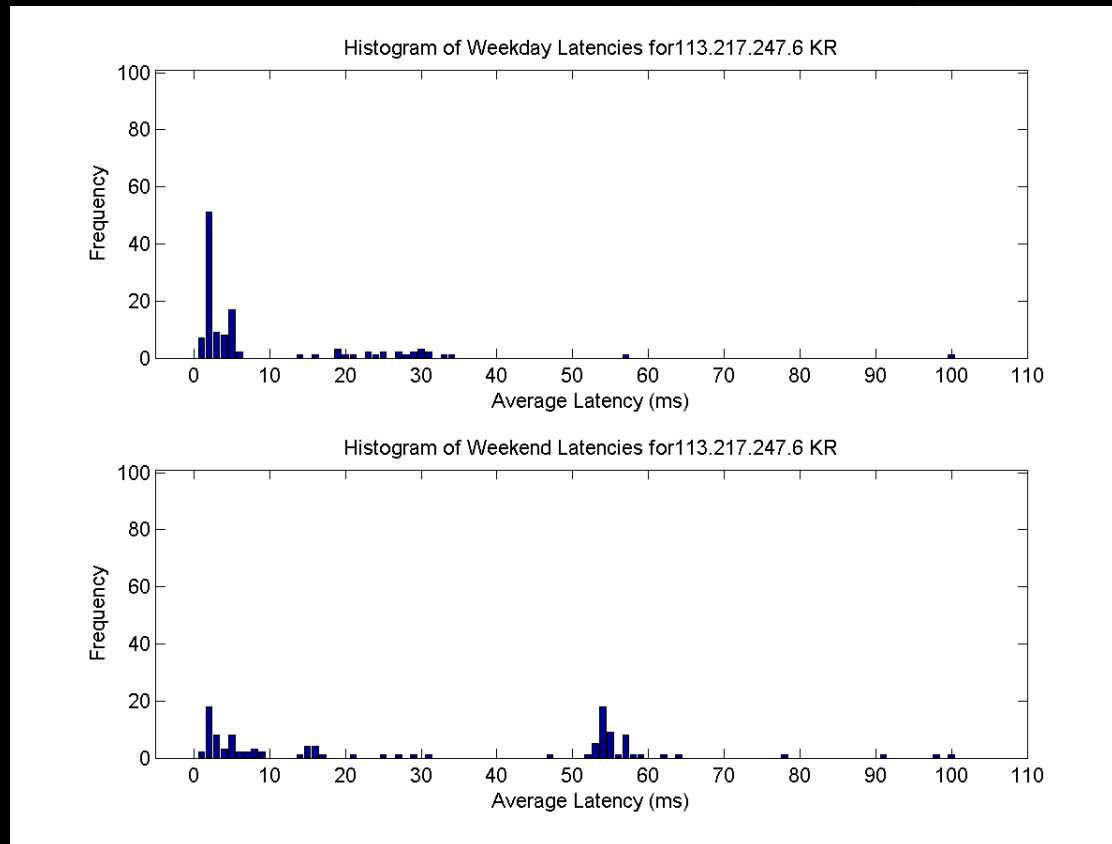
VARIATION IN LATENCY W.R.T. TIME

- Test Server : BR
 - Weekday Latencies : 175 ± 21 ms
 - Weekend Latencies : 215 ± 152 ms



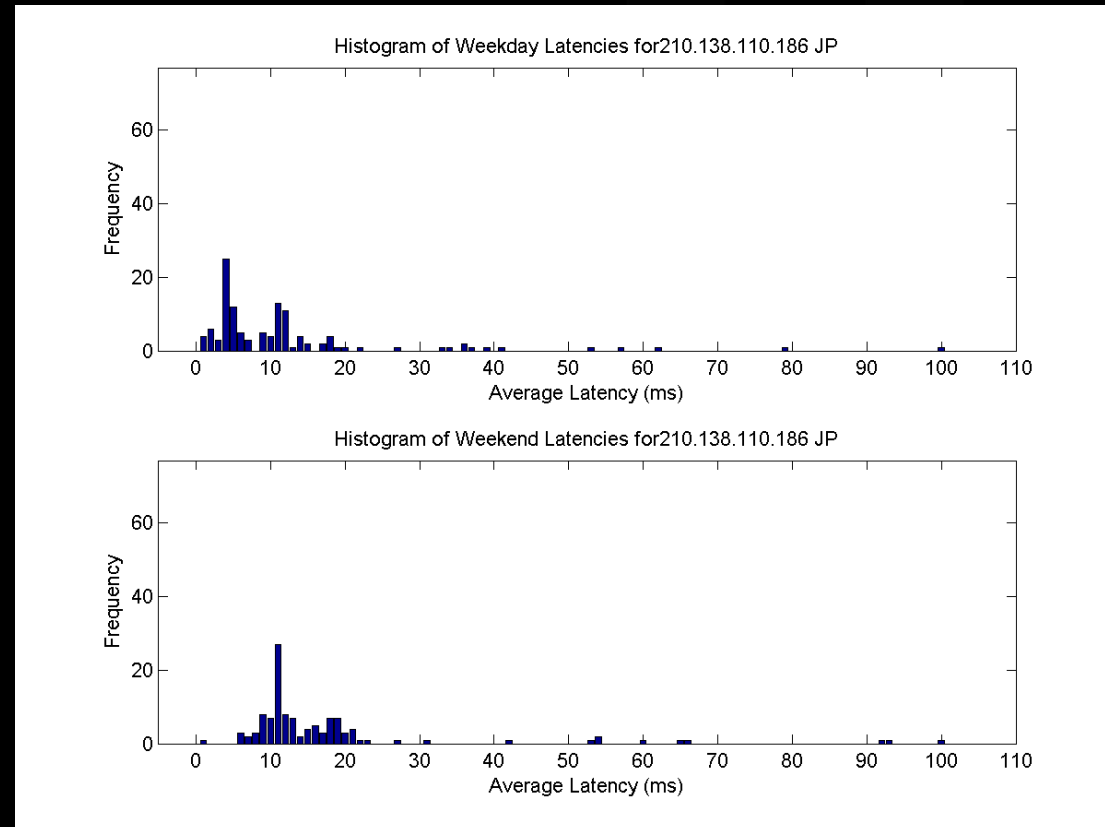
VARIATION IN LATENCY W.R.T. TIME

- Test Server : KR
 - Weekday Latencies : 201 ± 13 ms
 - Weekend Latencies : 224 ± 28 ms

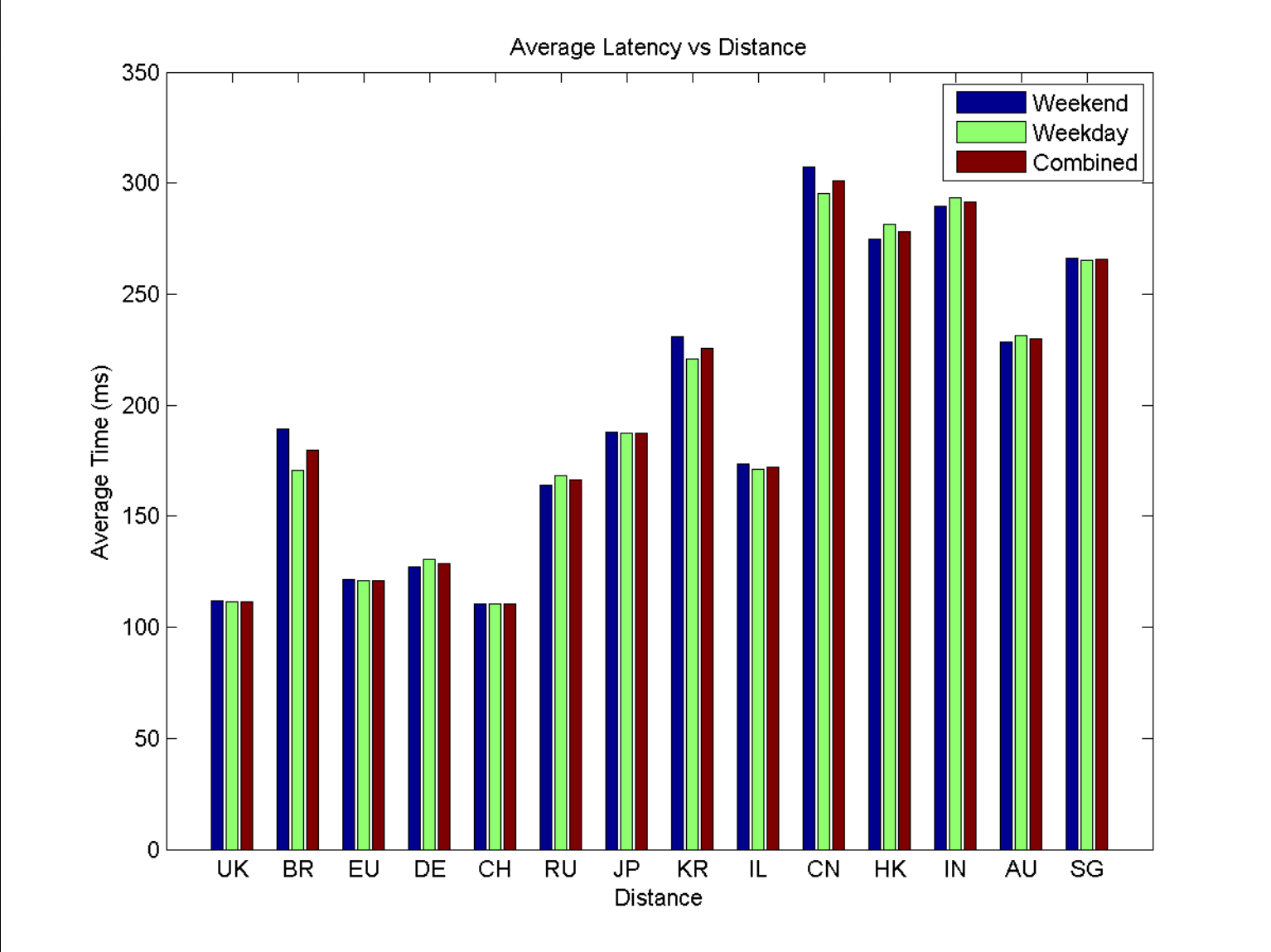


VARIATION IN LATENCY W.R.T. TIME

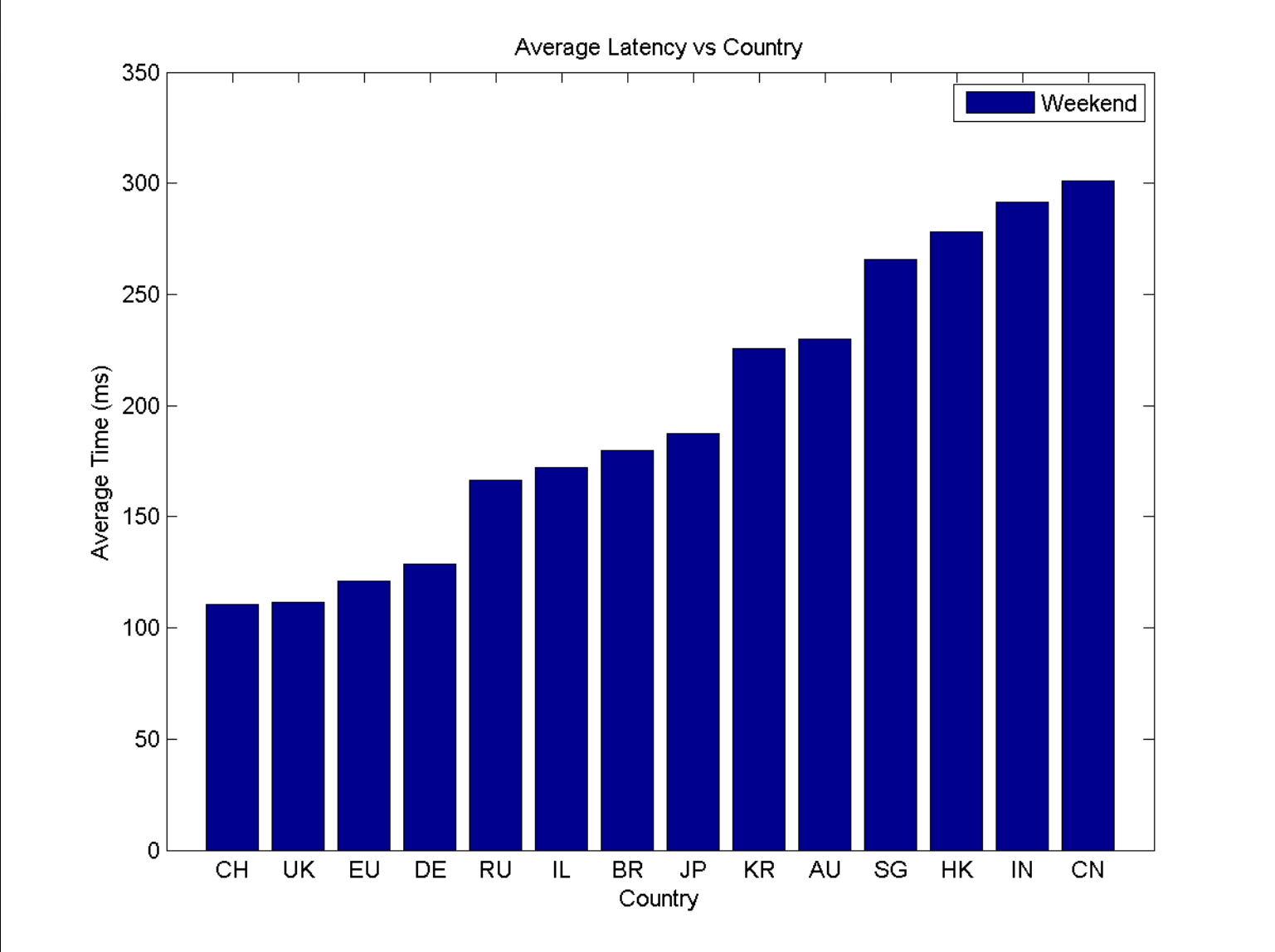
- Test Server : JP
 - Weekday Latencies : 277 ± 56 ms
 - Weekend Latencies : 306 ± 67 ms



LATENCY VS DISTANCE



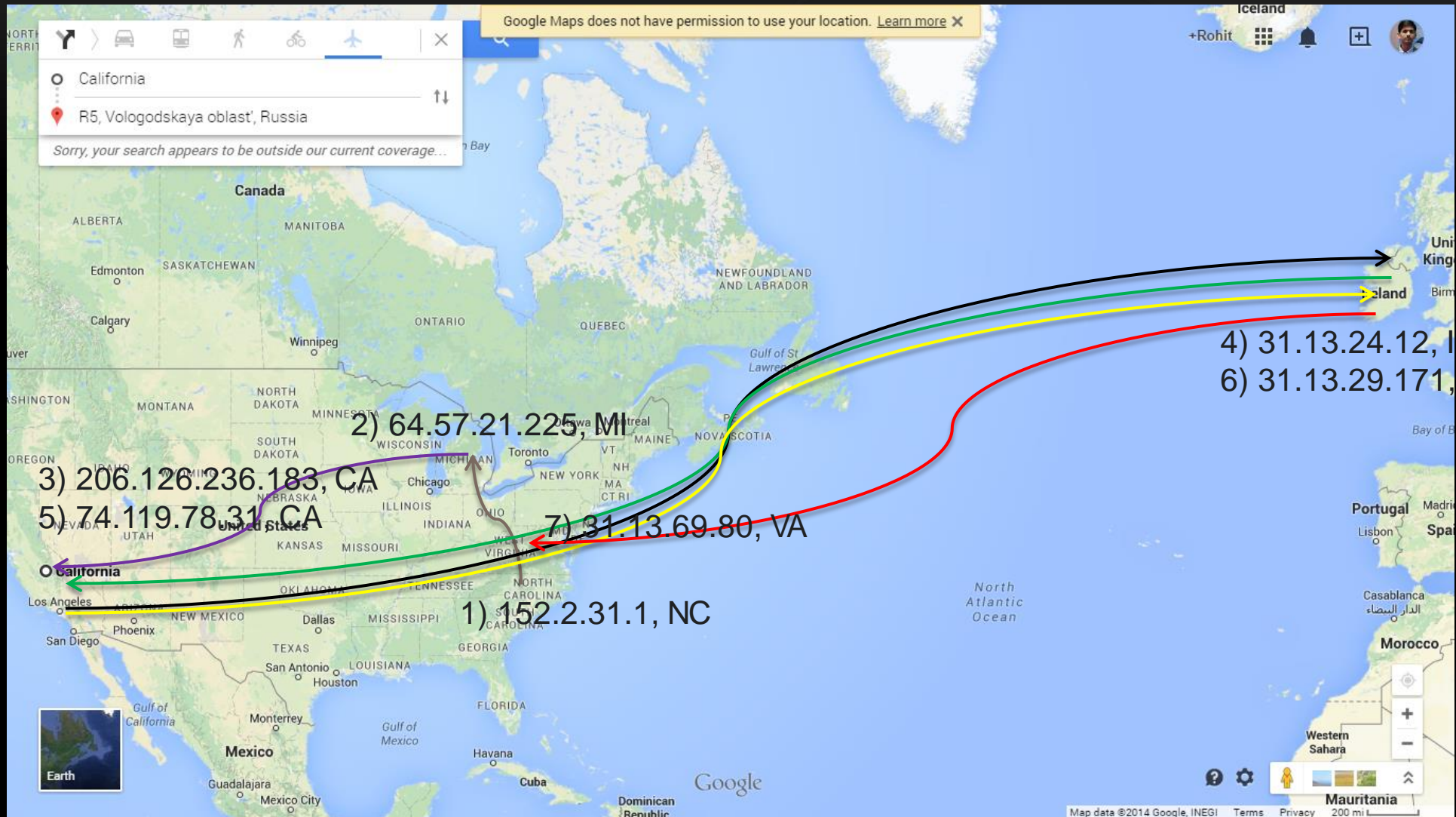
LATENCY VS COUNTRY



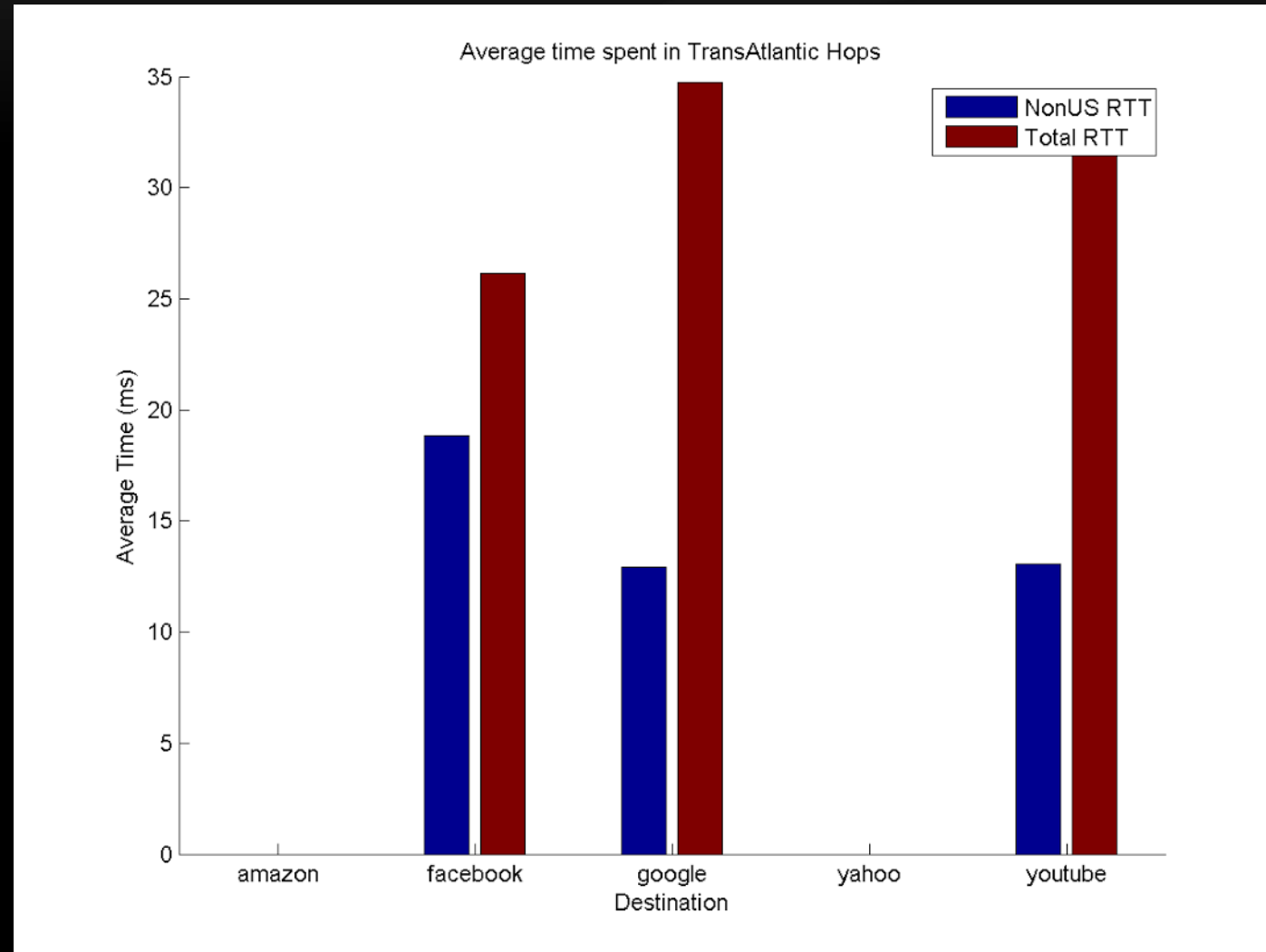
FREQUENCY OF TRANS-ATLANTIC HOPS

Amazon		Facebook		Google		Yahoo		Youtube	
Non-US	Total	Non-US	Total	Non-US	Total	Non-US	Total	Non-US	Total
0	1440	416	1440	195	1440	0	1440	222	1440

TRANS-ATLANTIC HOPS

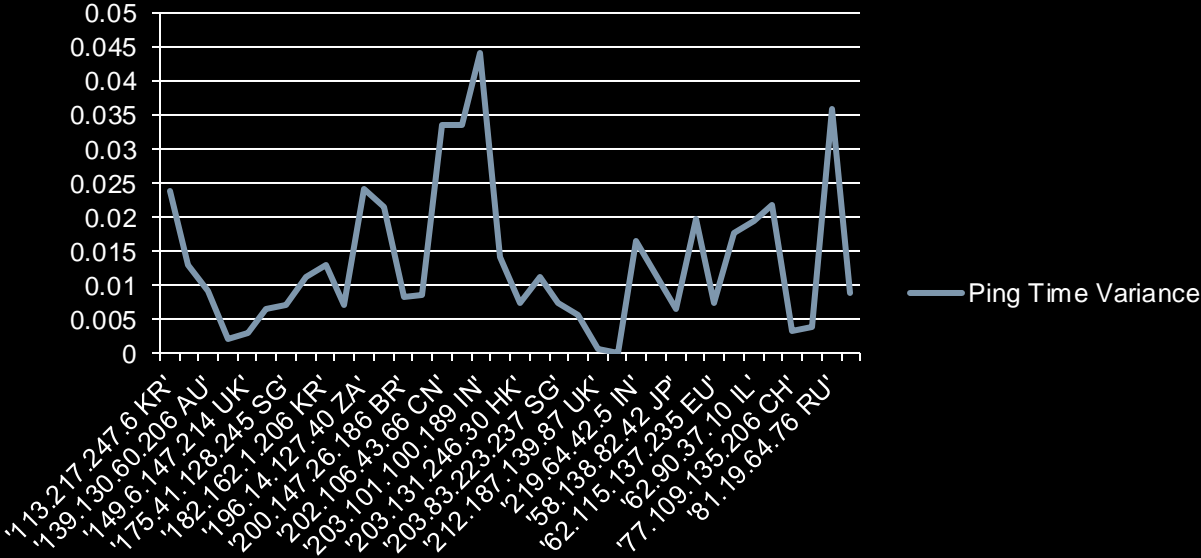


TRANS-ATLANTIC HOPS

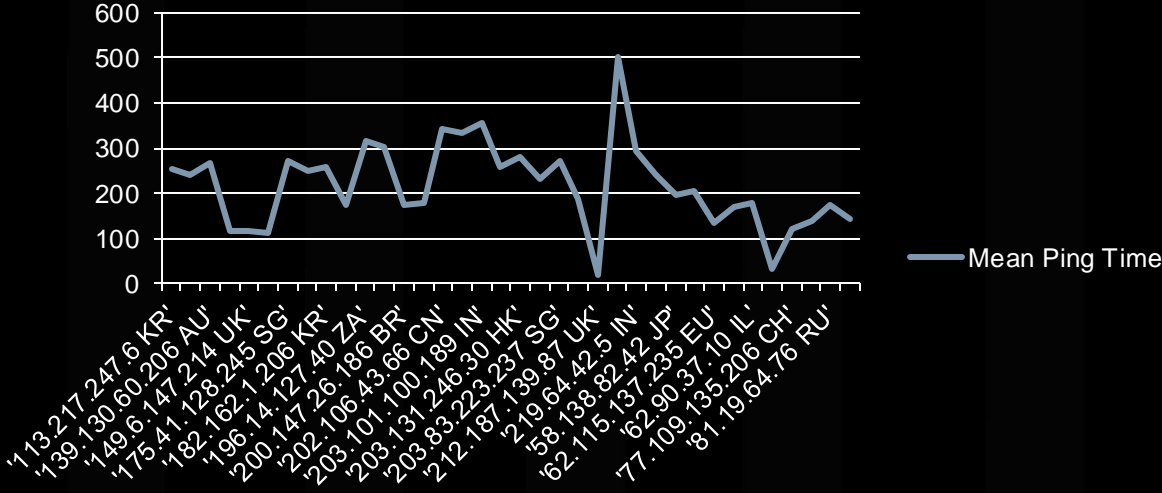


OVERALL MEAN AND VARIANCE

Ping Time Variance



Mean Ping Time



CONCLUSIONS

- Weekend Latencies are higher than Weekday Latencies for most countries
- Some countries like China, India, Hong Kong have almost 2 to 3 times higher latencies than other countries
- Some local pings route via different continents
- Non-US RTT are at times smaller than US RTTs for some pings
- Using our analysis we can possibly predict average latency for some specific countries

A faint, dark background image of a classical building with several columns, possibly a temple or a government building, centered behind the text.

QUESTIONS?