

MIST: Cellular Data Network Measurement for Mobile Applications

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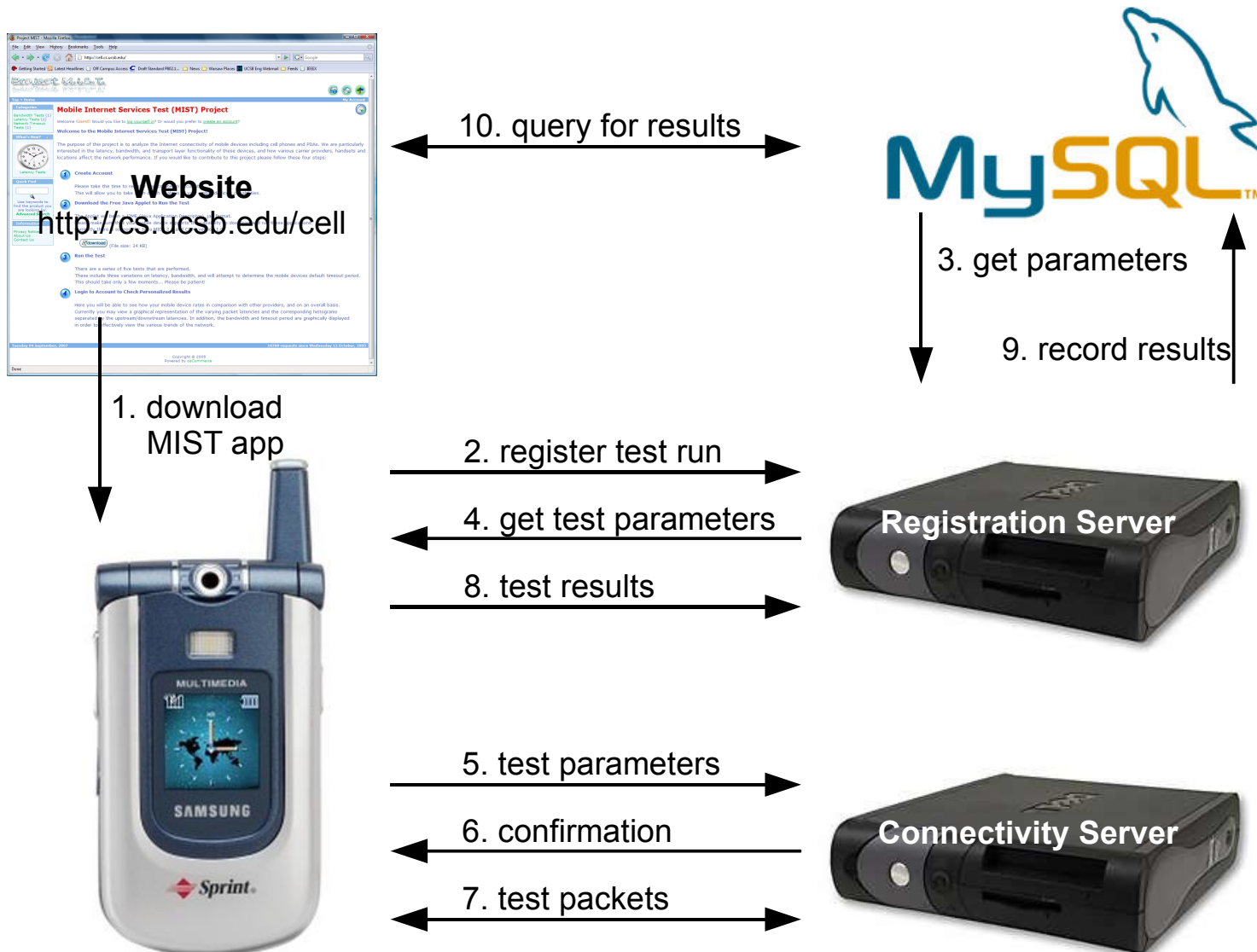
Introduction

- Cellular data network growth
 - SMS, email, Internet, Video
- Mobile application developers ready to cash in
- Quick-and-quality application development
- Unknown device and network performance

Mobile Application Challenges

Application Type	Challenges	Optimization Techniques
Streaming Media	- limited bandwidth	- layered encoding
Pervasive Gaming	- latency variation	- system specific timeouts
Two-way Database	- radio timeout	- keep alive packets

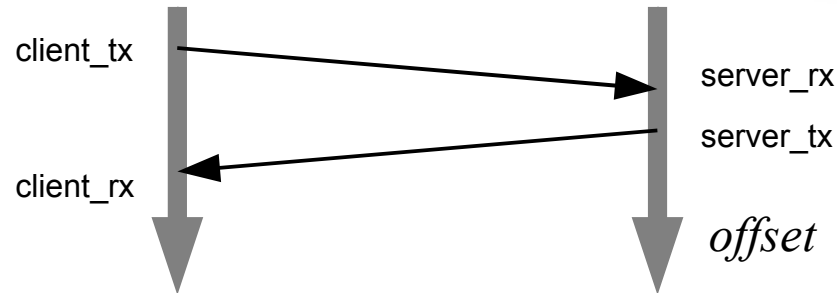
Mobile Internet Services Test (MIST)



MIST Network Measurement

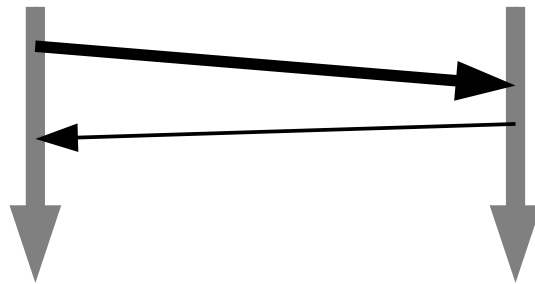


Latency

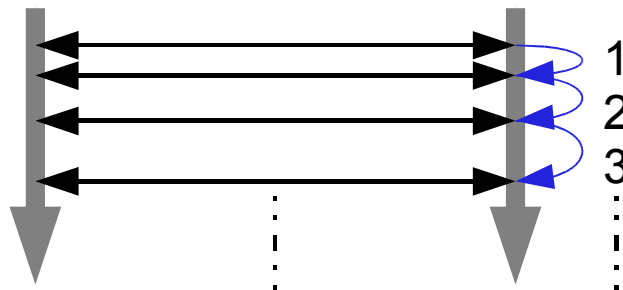


$$offset = \frac{rx_{server} - tx_{client} + tx_{server} - rx_{client}}{2}$$

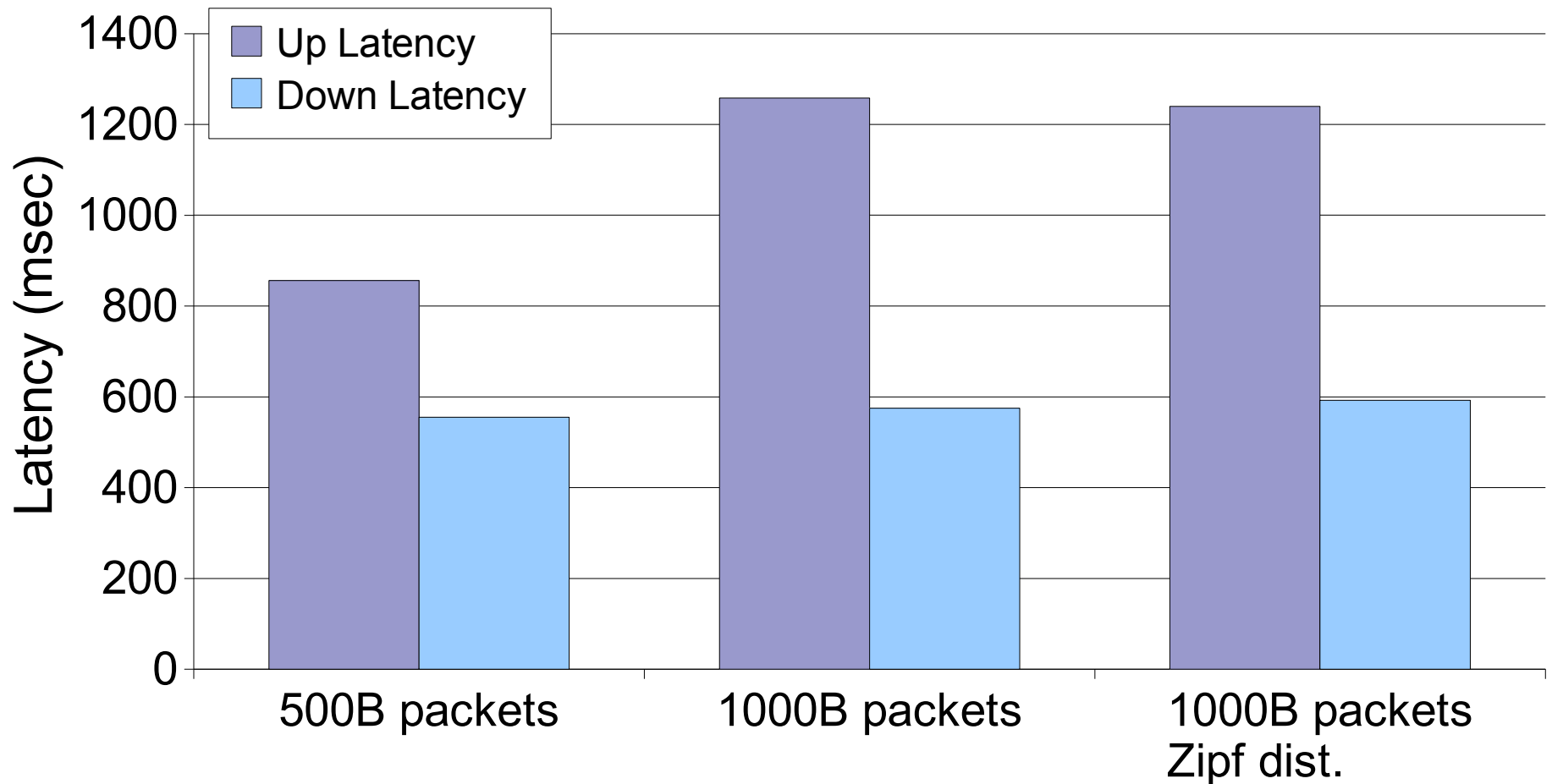
Throughput



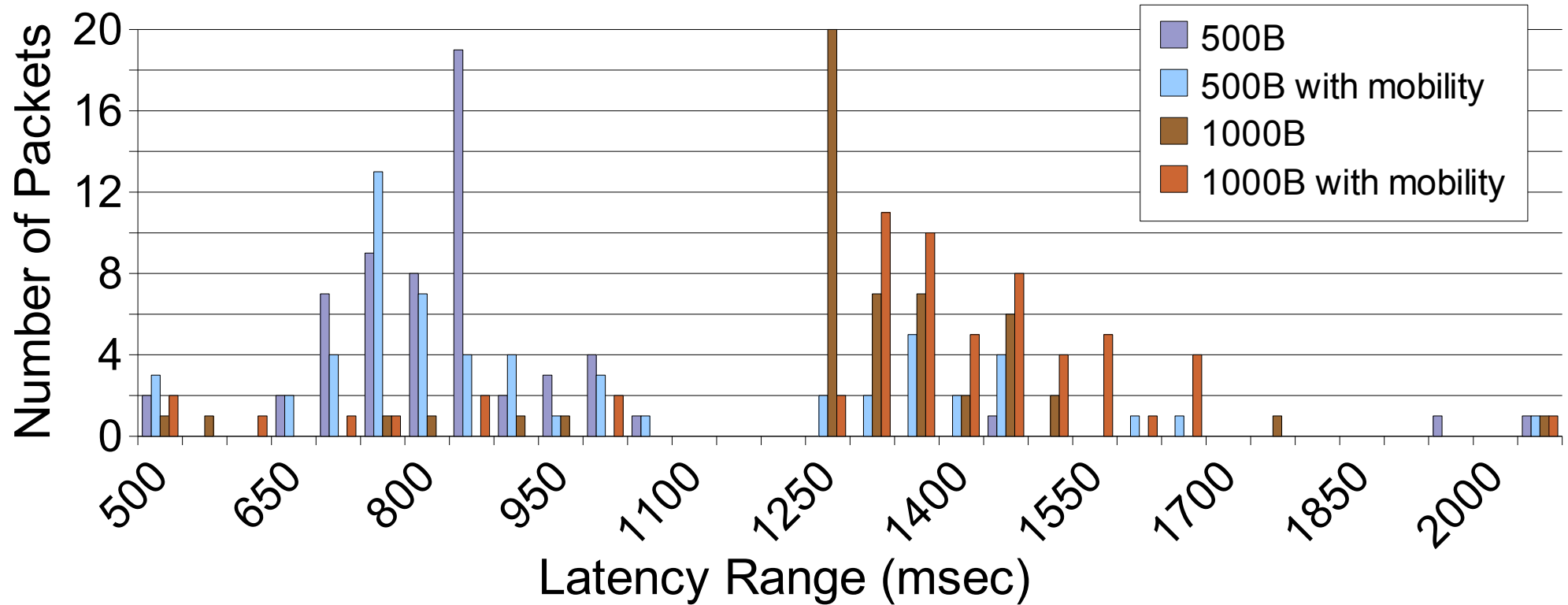
Timeout Interval



Uplink and Downlink Latency

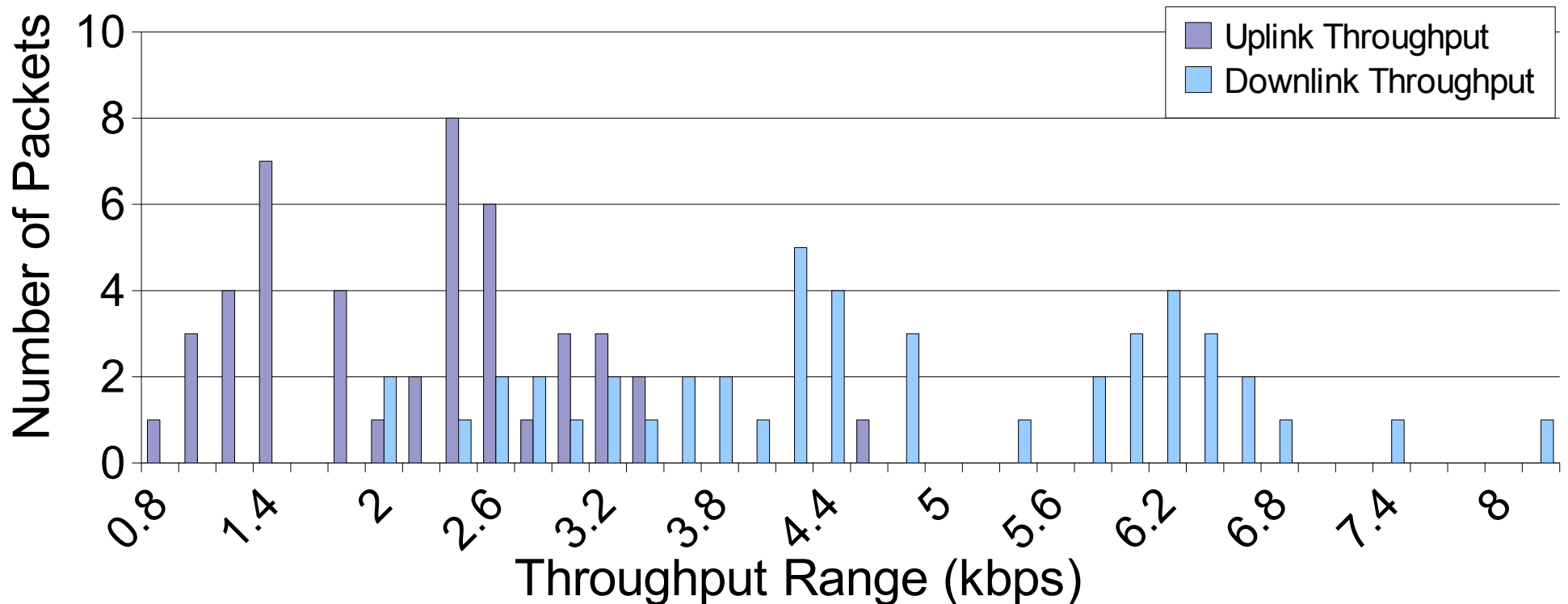


Latency and Mobility

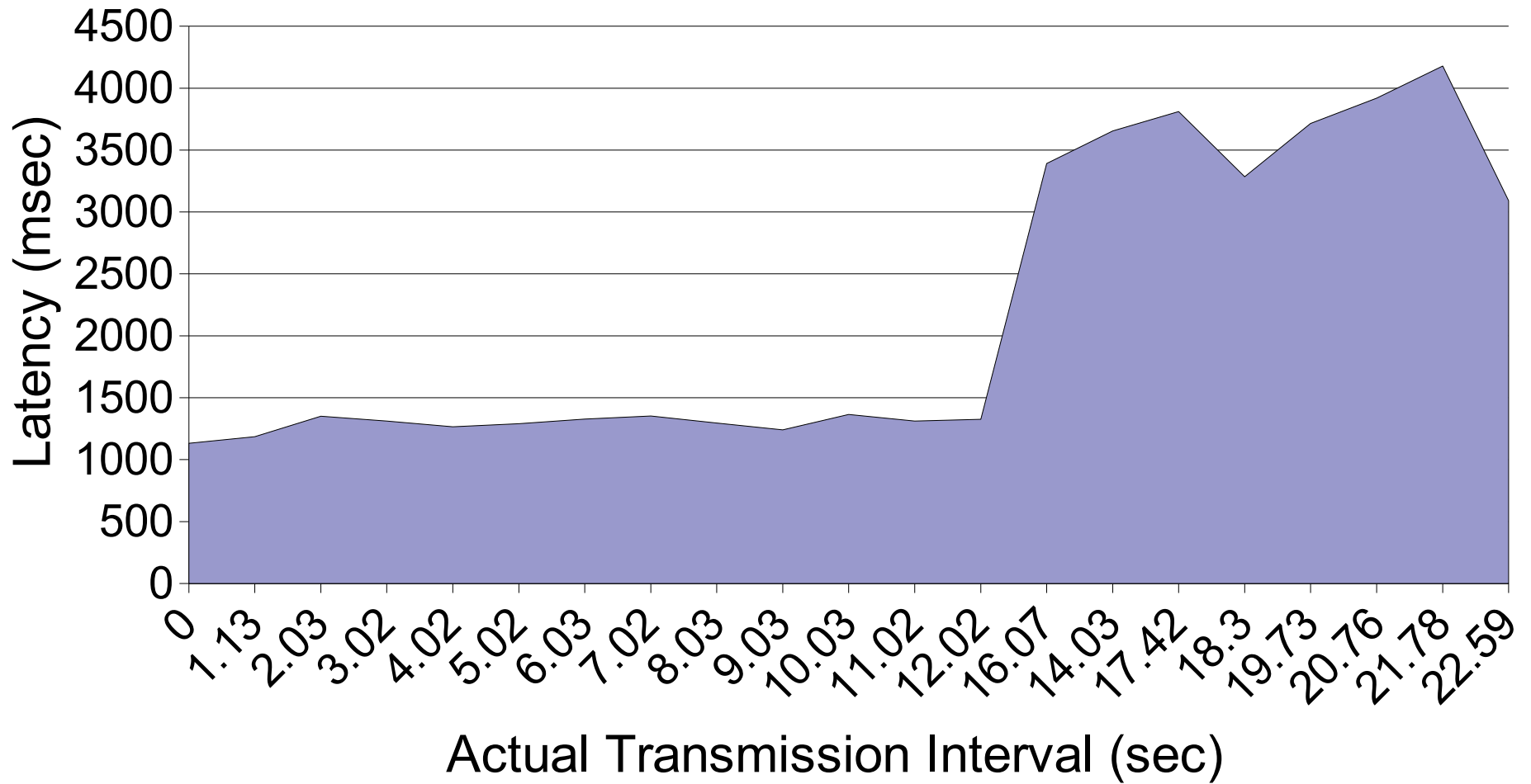


Service Throughput

Throughput (KBPS)	Uplink	Downlink
Minimum	0.79	1.82
Average	2.05	4.67
Maximum	4.47	11.17



Timeout Interval



Conclusions

- Multiple device and service provider combinations
- Geographically distributed measurement
- Application emulation
- Better tools for data visualization
- Processing power, flash crowds, other

Thank you

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