Performance of DASH and WebRTC Video Services for Mobile Users

Fraida Fund [*], Cong Wang [†], Yong Liu [*], Thanasis Korakis [*],
Michael Zink [†], Shivendra S. Panwar [*]

[*] Polytechnic Institute of New York University
[†] University of Massachusetts Amherst

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Talk Outline

- Measurement scenario
- Why did we collect this data?
- Wireless signal propagation characteristics
- DASH video measurements
- WebRTC measurements
- Publicly available dataset

Measurement Scenario

- Ran an **adaptive video application** (DASH, WebRTC) while moving at **walking speeds** through the coverage area of a highly **controlled cellular data network**
- Collected metrics that **directly** impact the user (e.g., video rate, frame rate) as well as metrics that **indirectly** impact user (wireless signal quality)

Why did we collect this data?

- Data captured from live wireless networks helps us understand how a real video application performs for an **individual** user using a real network under real conditions

Why did we collect this data?

- Data captured in different radio propagation environments helps us understand how video applications perform in different contexts

Why did we collect this data?

- Data captured from different classes of video applications (video on demand vs. real time communication) helps us understand the challenges of delivering video over wireless networks under different buffering constraints

Wireless Signal Propagation Characteristics

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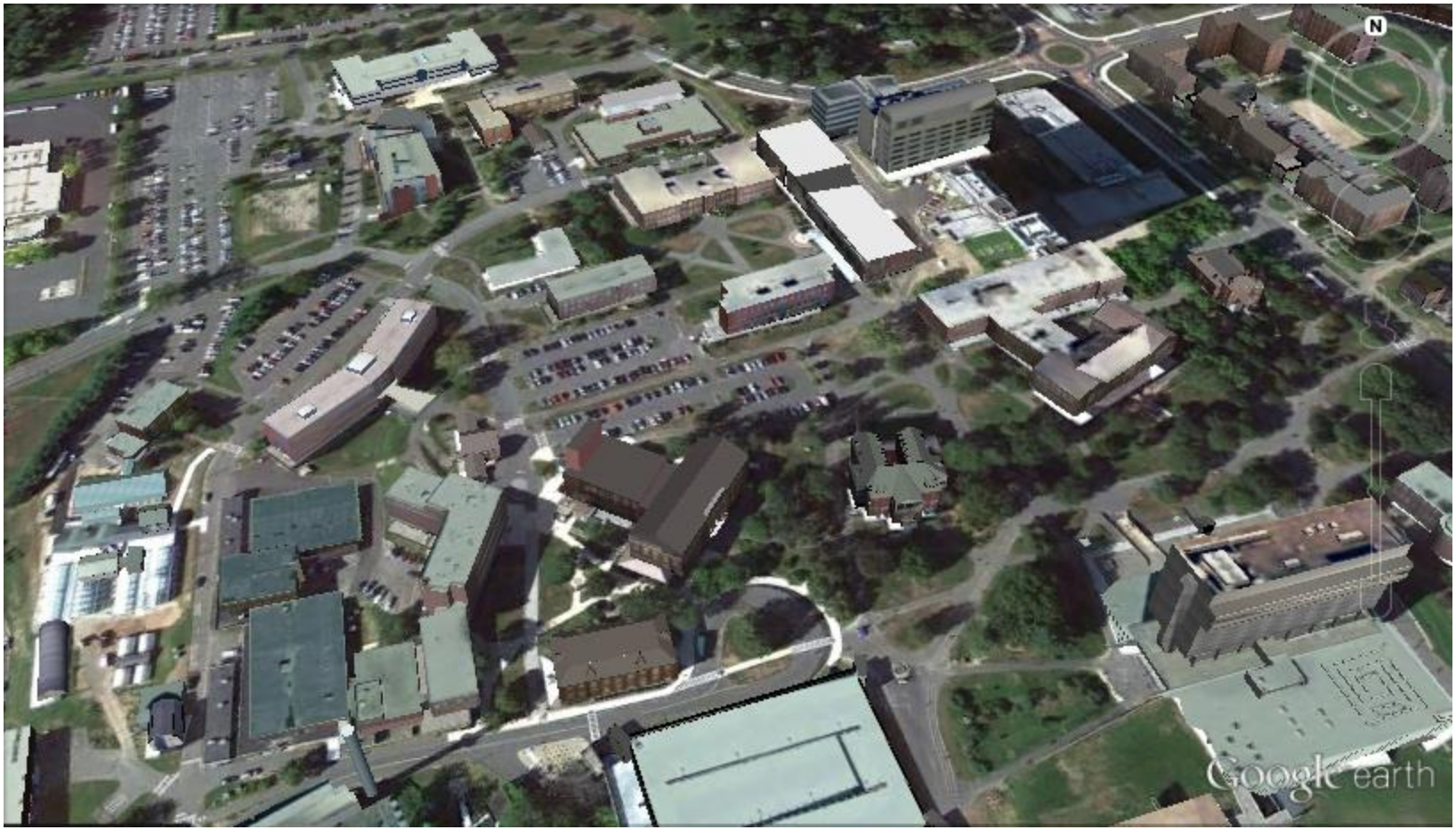

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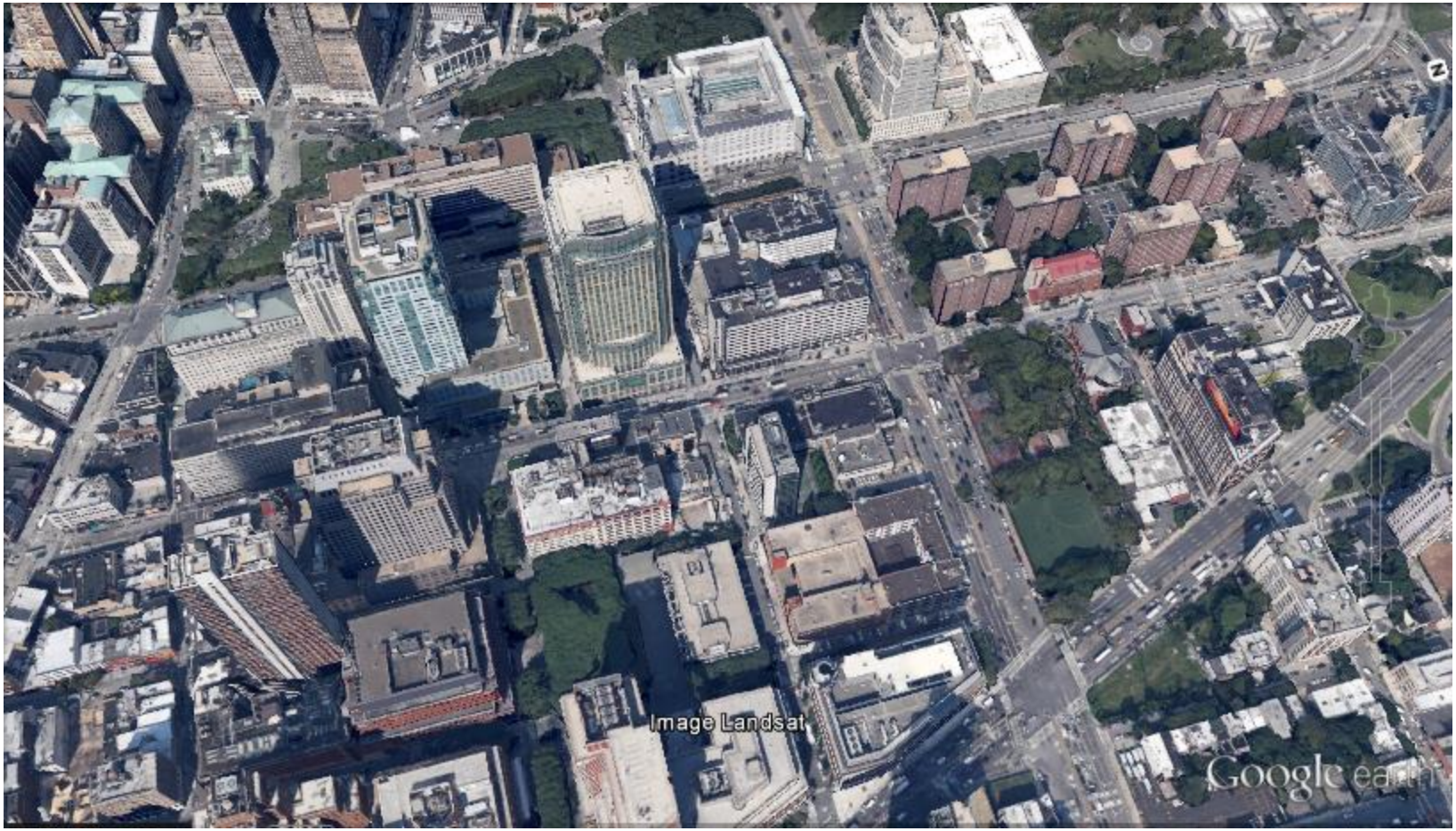

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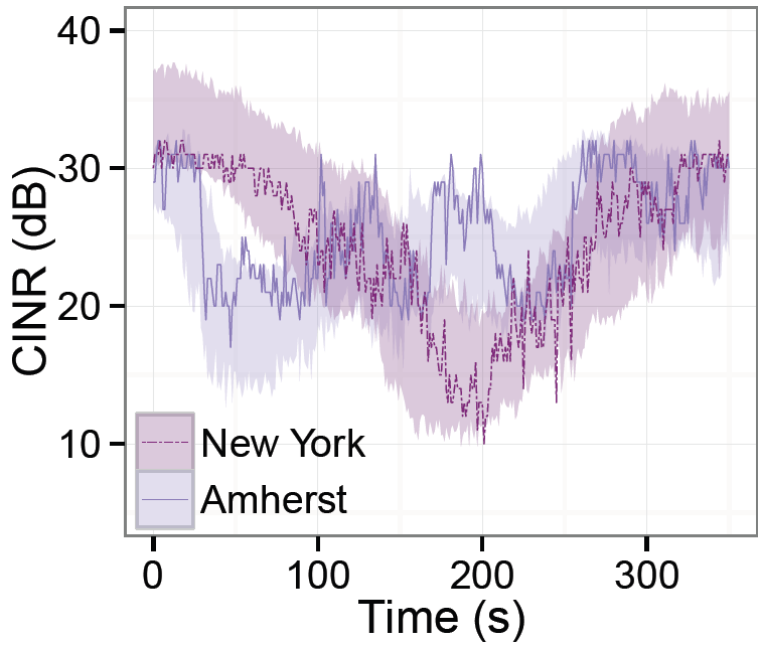
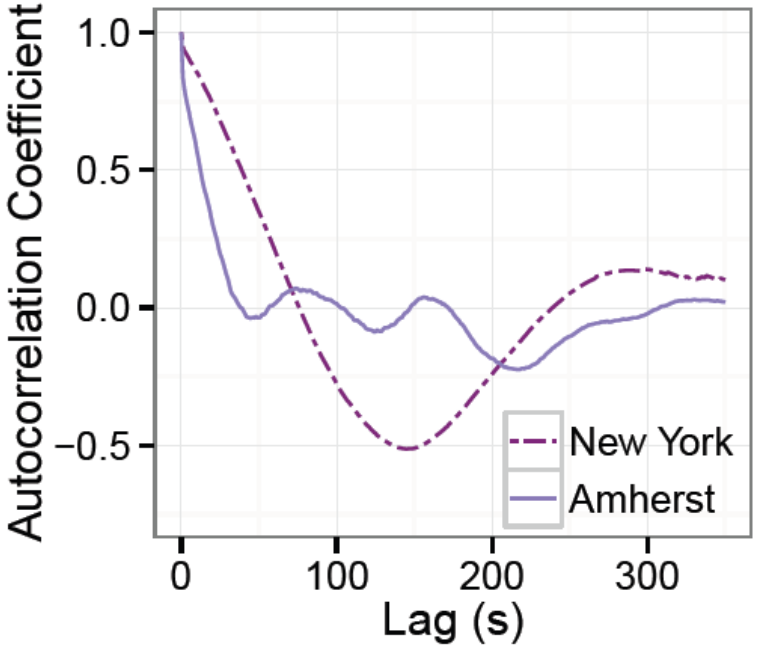
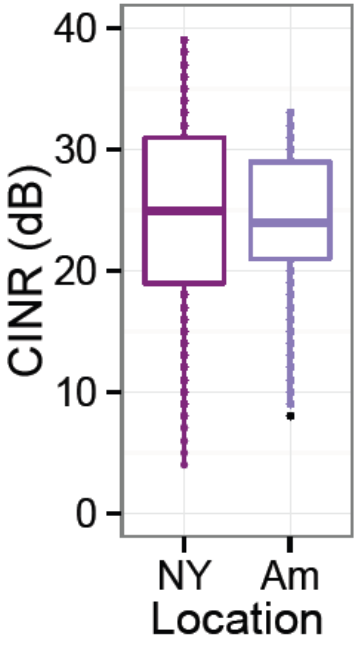
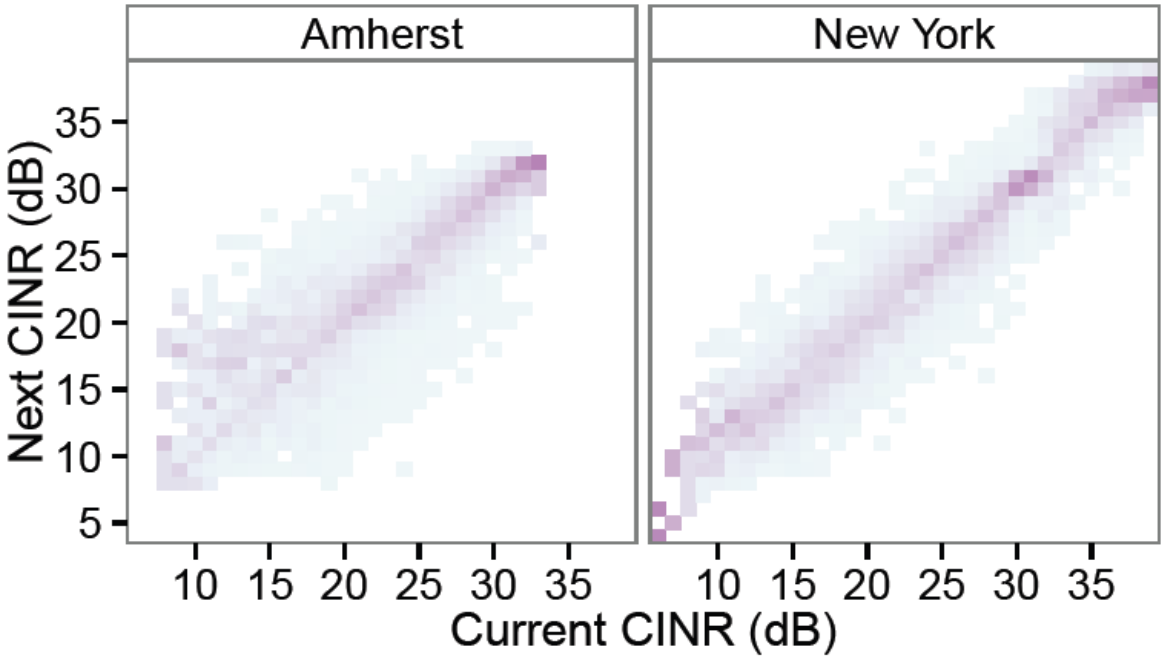
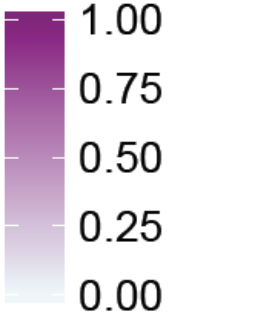

CINR (dB)
40
30
20
10
0
100
200
300
Time (s)
New York
Amherst


Autocorrelation Coefficient
1.0
0.5
0.0
−0.5
0
100
200
300
Lag (s)
New York
Amherst


CINR (dB)
40
30
20
10
0
NY
Am
Location


Amherst
New York
Next CINR (dB)
35
30
25
20
15
10
5
10
15
20
25
30
35
Current CINR (dB)


Transition probability
1.00
0.75
0.50
0.25
0.00

DASH video measurements

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DASH download policy

Simple policy (default in VLC DASH plugin):

- Retrieve the highest representation that is less then previous segment download rate,

except

- If buffer is nearing depletion, retrieve the lowest representation

DASH download policy

Why measure such a simple policy?

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Tale of Two Cities

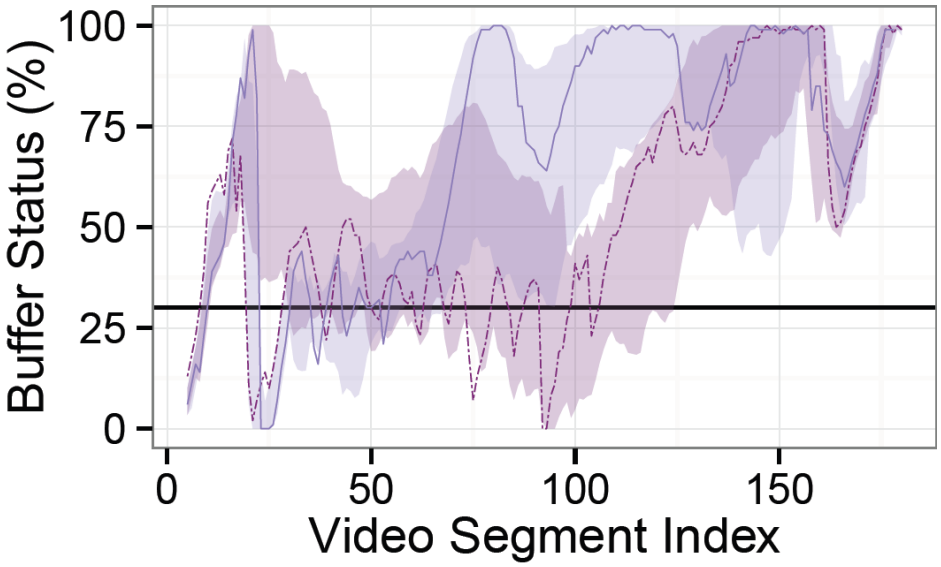
How does an adaptive VOD application react to changes in wireless link quality when

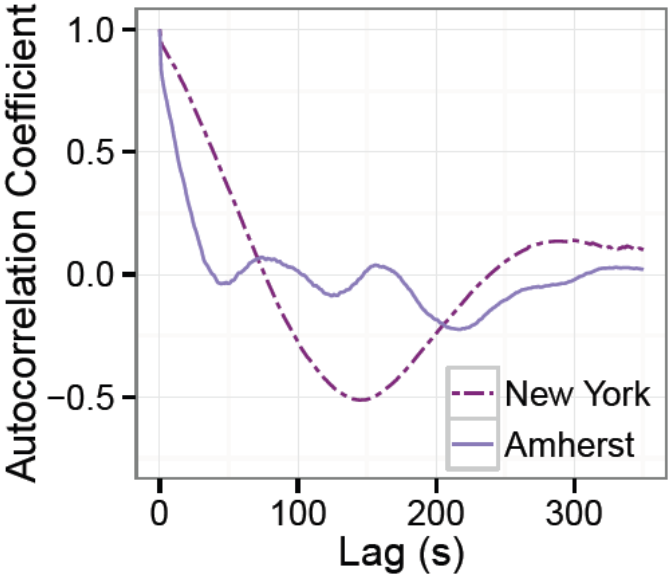
- Wireless signal is consistent for approximately the length of a city block?

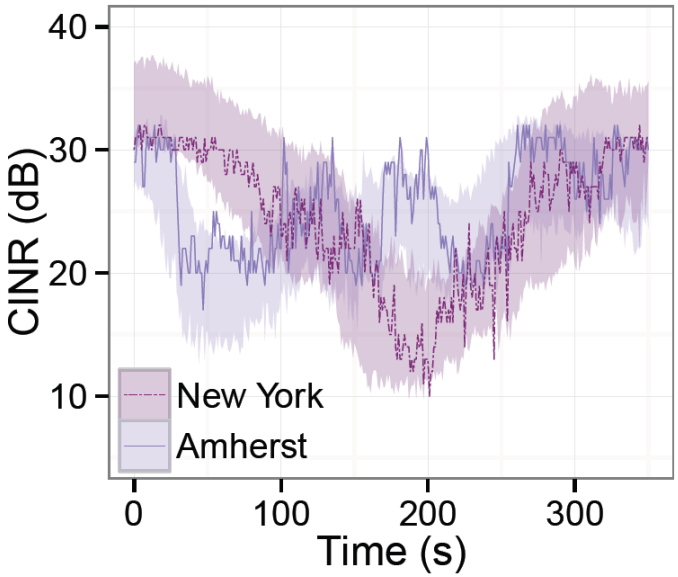
vs when

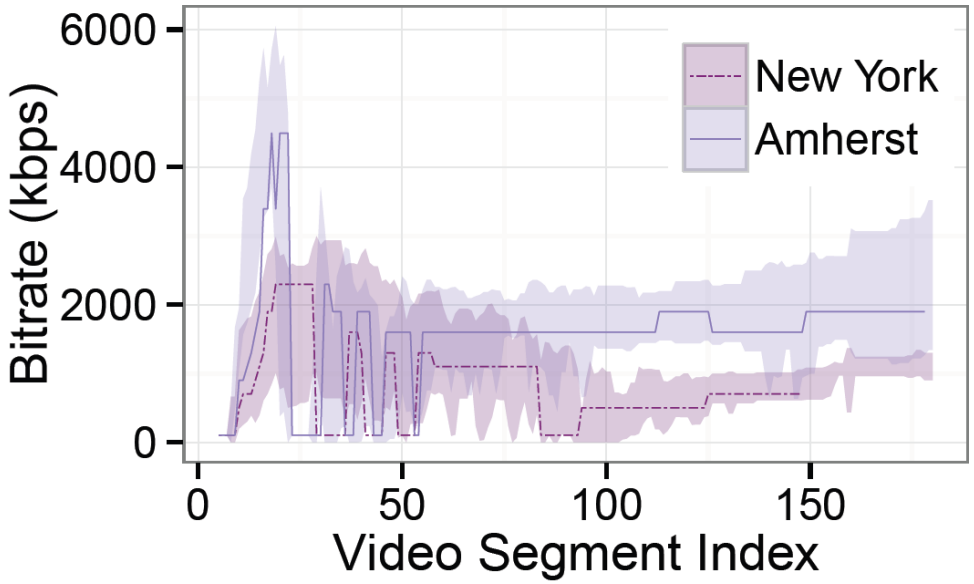
- Wireless signal is consistent for approximately the width of one building?

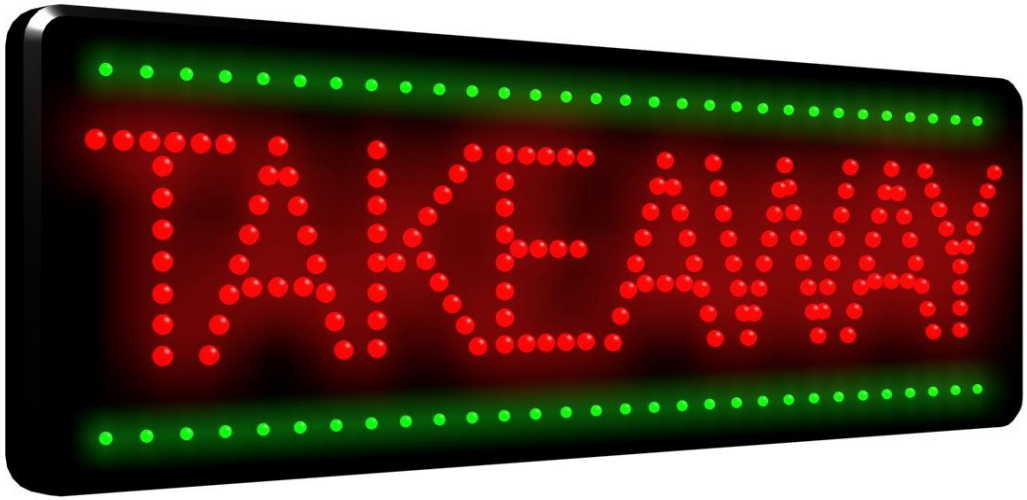
Tale of Two Cities











A consistent wireless channel is a double-edged sword

WebRTC measurements

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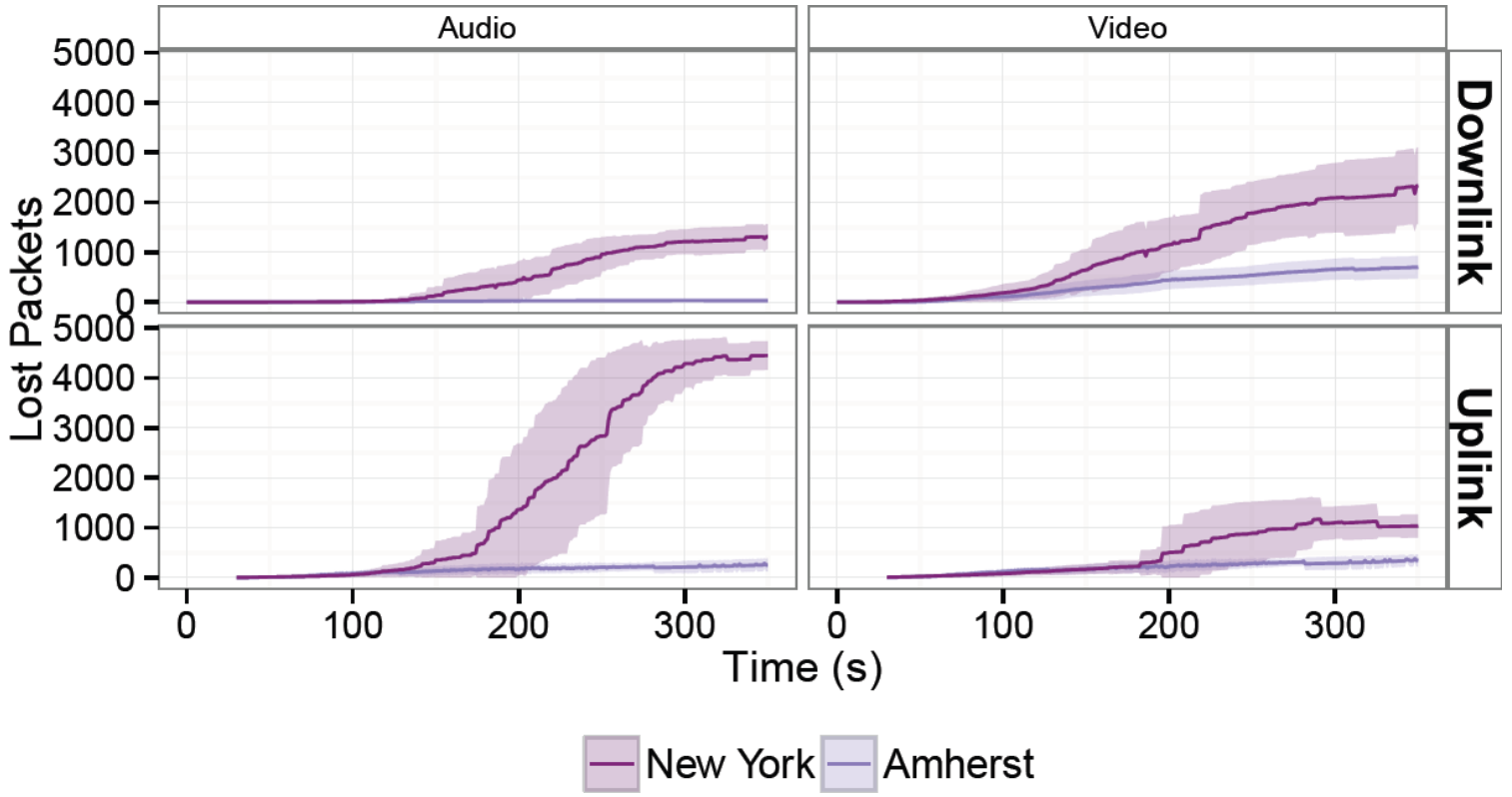
Packet Loss



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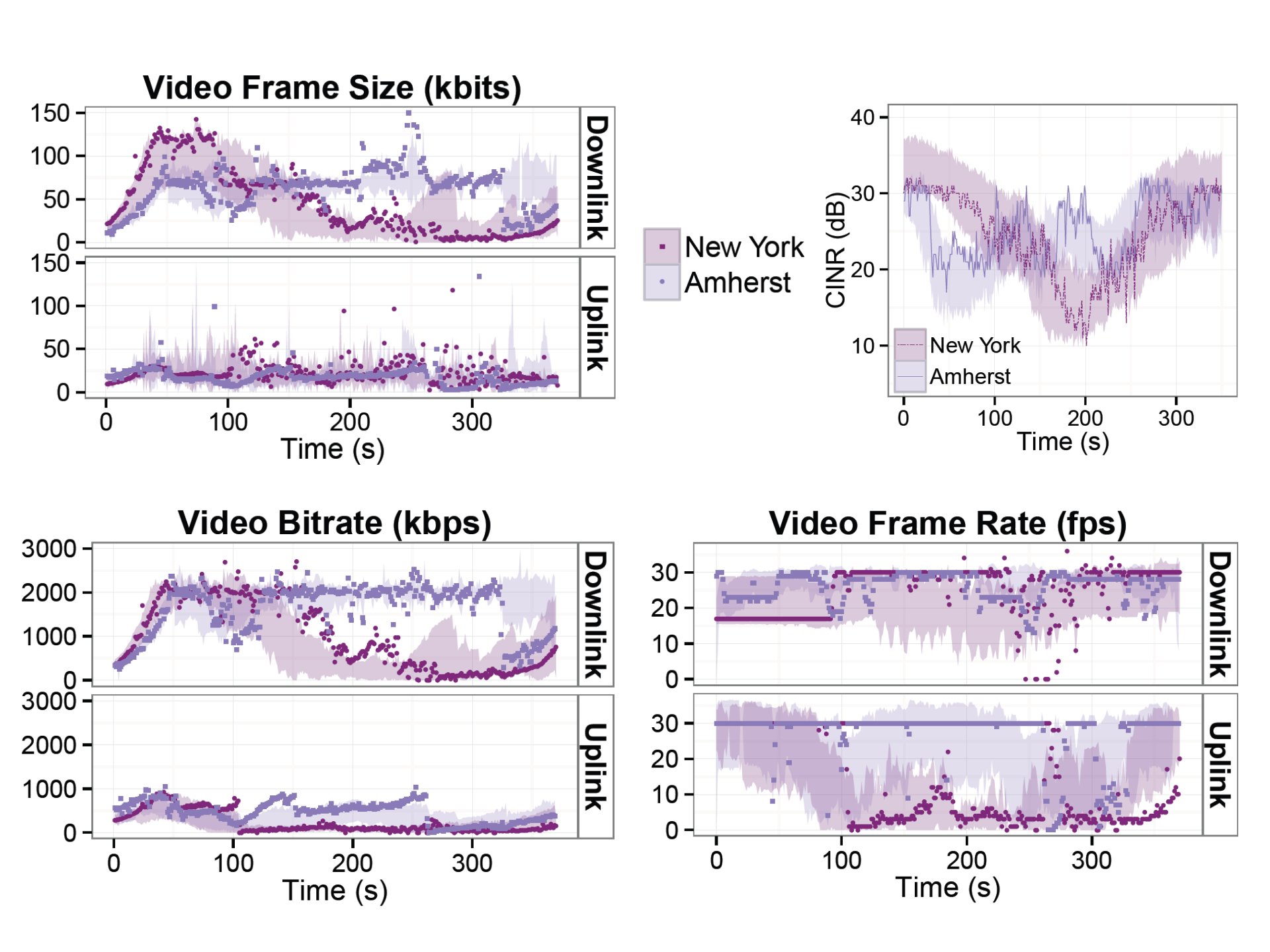
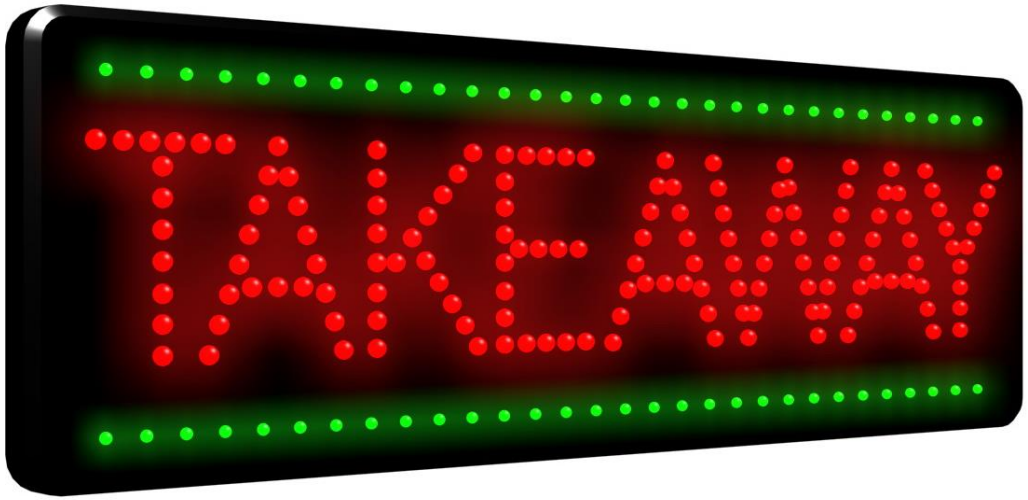
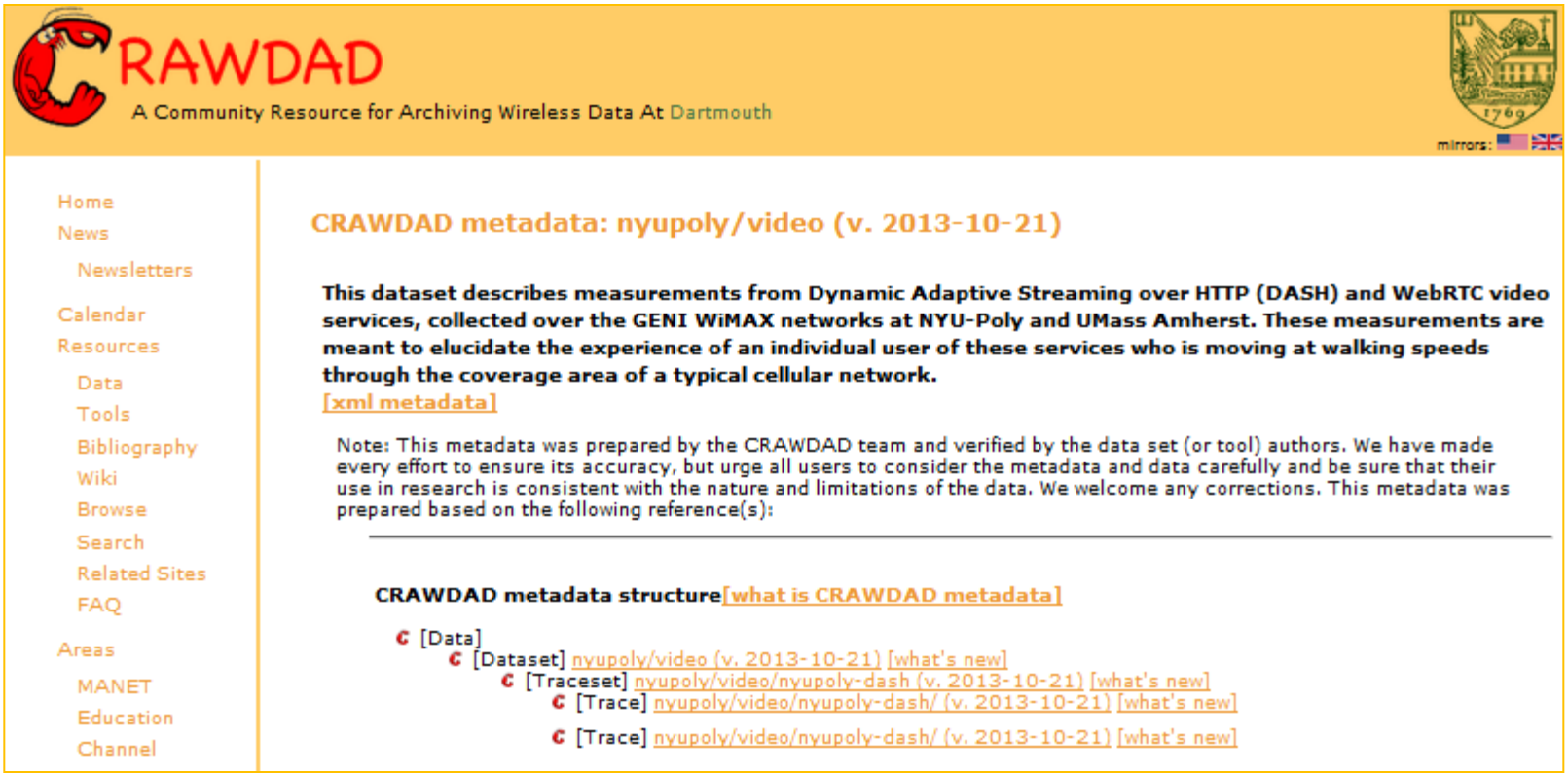

Video Frame Size (kbits)
Downlink
Uplink
150
100
50
0
0
100
200
300
Time (s)
New York
Amherst
CINR (dB)
40
30
20
10
Video Bitrate (kbps)
3000
2000
1000
Video Frame Rate (fps)



Challenging network scenarios remain challenging

Wireless Video Dataset

http://crawdad.cs.dartmouth.edu/nyupoly/video



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Thank you