

Measuring Broadband America

WIE 2015

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Broadband Impact

- ▶ Broadband and the Internet empowering our society
 - Productivity Gains
 - Enhanced communications
 - Entertainment
 - Public Safety
 - Connected Government
 - ▶ Important to measure availability and quality of broadband
 - Availability
 - Performance
 - Year by Year Trends
 - ▶ Open Internet Order established transparency requirements for BIAS providers
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FCC Measuring Broadband America Program

- ▶ 2010 – initiated program to provide most accurate data on fixed broadband to the home
 - Includes ISPs supporting 85% of consumers
 - White boxes deployed in homes of 5500 volunteers
- ▶ 2014 – initiated coverage of mobile broadband performance
 - Crowd sourcing approach: apps for iPhone and Android
 - Data collected includes performance data, cell tower/service coverage data, and phone data

What Is Measured

Sustained Download *	Burst Download
Sustained Upload *	Burst Upload
UDP Latency *	Web Browsing Download
UDP Packet Loss *	Video Streaming Measure
VoIP Measure	DNS Resolution
DNS Failures	ICMP Latency
ICMP Packet Loss	Latency Under Load
Total Bytes Downloaded	Total Bytes Uploaded

* Mobile Measurement

What Will Be Emphasized

- ▶ Open Internet Order establishes transparency on speed, packet loss, latency
- ▶ MBA program will emphasize these as primary measurements
- ▶ Increasingly aligning program with Open Internet Policy
- ▶ Still evolving:
 - Launched standards efforts about 4 years ago
 - Video streaming work with Netflix, Youtube, Hulu
 - Viewed as experimental
 - Interest in interconnection points
- ▶ Important take-away
 - Many patterns in Internet, congestion occurs and can be short term or long term

Fixed Program

- ▶ Annual report
 - Baseline data for report collected Sept/Oct annually
 - Testing runs continually throughout the year
 - All collected data available on website
 - Solicit suggestions on use/adaptations
- ▶ Research initiatives supported when feasible
 - WTF – Georgia Tech
 - Latency data provided to Caida
 - Packet loss data at higher resolution to Independent Measurement Experts
 - CGN studies, congestion studies under consideration
 - Consumer nodes can be limiting factor
- ▶ Recently finding 100 Mb/s rates and higher challenging measurement platforms
 - Our experience: you know when it's broke; you might not now when it's degraded
 - Gigaohm: Netflix Issue
- ▶ Interest in shaping program to better support research

mobile Measuring Broadband America

- ▶ Test data collected from volunteers' phones
 - No PII data collected, no ads, no commercial intent
 - Privacy policies developed with outside experts, wireless carriers, FTC and FCC
 - Apps released as open source for inspection
 - Open methodology developed with industry collaboration
- ▶ Evolving project
 - Produced early maps from data early 2014
 - But industry concerns regarding statistical validity delayed public reporting

Mobile Data Complexity

- ▶ Extensive analysis of data in comparison with other data sets
 - e.g. Ookla, rootmetric
- ▶ At sufficient levels of aggregation
 - Data meets statistical validity criteria
 - All data sets in general agreement
- ▶ At sufficient levels of disaggregation, weaknesses in methodologies become apparent
 - Crowd sourcing and drive testing both dependent upon limited sample sets at high area resolutions

Industry Concerns

- ▶ Mobile competitive environment is fierce
 - ▶ Government comment on performance perceived as threatening
 - ▶ Vigorous push-back from some participants
 - ▶ Lengthy process to establish validity of data
 - But also a recognition that fairly presenting mobile information to the public is difficult
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Platforms Supported

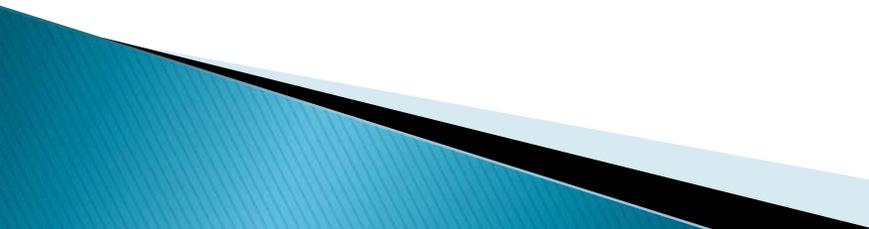
▶ Android

- Released in mid–November 2013
- Available at Google Play: FCC Speed Test

▶ iPhone

- Released February 2014
 - Available to public at iPhone App Store: FCC Speed Test
 - For a very short time we were 4th most popular app in the store
- ▶ Android phones provide 4x data as iPhones due to automatic scheduling of tests

Enlisting Volunteers

- ▶ Event oriented
 - ▶ News article or blog post last about 10 days
 - ▶ Evolving outreach program to keep reinforcing program and apps
 - ▶ We have been silent on this app for well over a year due to industry concerns
 - However – Last competitive wireless report included MBA data as does current report (in draft)
 - Will seek to spotlight program in 2016
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Privacy Concerns in Mobile Data

- ▶ Privacy aspects of Internet data a growing concern
 - NTIA/FTC have led industry discussions
 - Privacy discussions still in early stage
 - Many Company's T&Cs seek to protect the company, not the consumer
- ▶ FCC collection of data
 - Goal to protect consumer
 - Seek only necessary data supporting understanding of broadband services and broadband network
 - Data release will comport with privacy policies

FCC Data Collection

- ▶ Handset data fully anonymized
 - Let to changes in initial design strategies
 - Privacy analysis of data with outside parties
 - Further obfuscation of data when required for public release
 - Thresholds, aggregation of some parameters
 - Expect to begin releasing data in 2016
- ▶ Other agencies and organizations collecting mobile data
 - Use of such data may be entangled with privacy concerns and sharing may be difficult
- ▶ Goal to start a discussion on common privacy policies for collection of mobile data
 - Non-aligned and sometimes conflicting interests in privacy objectives: consumer protection, industry market info, national security

MBA Program

- ▶ Ongoing to support interests of Commission
 - ▶ Responsive to interests of research community when feasible
 - ▶ Suggestions from improvements, access to data, refinements of data welcome
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Thank you

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