COVID-19 Network Impacts

IAB Workshop, Nov 9-13, 2020, online

Note Well

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- BCP 9 (Internet Standards Process)
- BCP 25 (Working Group processes)
- BCP 25 (Anti-Harassment Procedures)
- BCP 54 (Code of Conduct)
- BCP 78 (Copyright)
- BCP 79 (Patents, Participation)
- https://www.ietf.org/privacy-policy/ (Privacy Policy)

Logistics

- Workshop webpage and papers:
  https://www.iab.org/activities/workshops/covid-19-network-impacts-workshop-2020/
- Slides are on Github:
  https://github.com/intarchboard/covid19-workshop
- This Webex session:
  https://ietf.webex.com/ietf/j.php?MTID=mb17837cebbe23c0e3b81e7e4e27974c6
  - **This session will be recorded and published later. Recording can be turned of if needed.**
  - Your video will be off by default when you join the session. You may choose to turn it on when you are speaking or presenting.
  - Mute your microphone unless you are speaking.
  - **Use Webex chat (only) to join the mic queue.**
    - **"+q" adds you to the queue**
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- Please add your name and affiliation to Etherpad:
  https://pad.riseup.net/p/covid19networkimpacts

Workshop scope and goals

The COVID-19 pandemic has had a tremendous impact on people's lives, the societies and economies around the globe. But it also had big ***impact on networking***, with large numbers of people working from home. Internet service providers and operators have reported ***20% traffic growth or more in a matter of weeks***, with conversational multimedia traffic growing in some cases more than 200%. In general, the Internet has coped relatively well with this traffic growth but there were also a few outages or other noticeable impacts, e.g. video quality reductions.

Goal: to see how the technology, operators, and service providers have been able to respond to large changes in traffic patterns and lessons learnt for operations as well as impacting architecture:

- Understand what actually happened with Internet traffic
- Understand what types of network management and capacity expansion actions were taken
- Understand the impact of traffic shifts and growth more generally, also to prepare for future situations — crisis or otherwise – that impact networking

Agenda

Mon Nov 9, 1400-1600 UTC: **Session 1- Measurements and Observations** **(Session lead: Mirja Kühlewind)**

    1400-1410 Introduction

    1410-1440 8 x ~5 minute invited presentations on specific measurements/observations

    1450-1500 break

    1500-1550 discussion, identify issues arising

Wed Nov 11, 1400-1600 UTC: **Session 2 - Operational Issues** **(Session lead: Cullen Jennings)**

    1400-1410 Introduction

    1410-1440 How did n/w and apps operators work together to make a better experience…

    1450-1500 break

    1500-1550 discussion, identify issues arising

Fri Nov 13, 1400-1600 UTC: **Session 3 - Future/Conclusions/Parking Lot** **(Session lead: Stephen Farrell)**

    1400-1410 Introduction

    1410-1440 Finalise list of issues for discussion

    1450-1500 break

    1500-1550 discussion, actions, plans

High-level observations on traffic growth and patterns

- Significant increase in traffic growth rate in March/April

- Changes in the traffic patterns

  - Traffic in mobile network decreased and traffic from home network increased

  - Strong increase in video conferencing (incl remote schooling)

- Network load noticeably increased but most operators reacted quickly by adding new capacity (earlier?)

- Last mile congestion/higher latency on legacy network (PPPoE)

Session 1- Measurements and Observations

Overall traffic growth

The Lockdown Effect: Implications of the COVID-19 Pandemic on Internet Traffic - *Oliver Hohlfeld*

Changes in traffic patterns

Campus traffic and e-Learning during COVID-19 pandemic - *Martino Trevisan*

A Characterization of the COVID-19 Pandemic Impact on a Mobile Network Operator Traffic - *Andra Lutu/Diego Perino*

A deeper look at interconnections

Interconnection Changes in the United States - *Nick Feamster/Jason Livingood*

Measuring congestion on interconnection links - *David Clark*

Measuring the impact of COVID-19 on cloud network performance - *Ricky Mok*

Last mile congestion

On the COVID-19 impact to broadband traffic in Japan - *Kenjiro Cho*

The Impact of COVID-19 on Last-mile Latency - *Romain Fontugne*

Questions to discuss/answer

- Are there measurement results that need further digging to get an in-depth understanding of potential problems?

- What measurements overall are we (the research community/engineering community/society) potentially missing? What's e.g. about DNS?

- What is the "normal" traffic pattern and how quickly can it change?

- What are the "needs" of the society from the Internet regarding capacity, performance/QoS, and resilience? Are there regional differences? How much are user expected/willing to adopt changing network condition?

- Was it luck or well managed? (-> more in tomorrow's session probably)