

Brief to Standing Committee on Industry, Science and Technology, Re: Canadian response to the COVID-19 pandemic¹.

Introduction

I² am submitting this brief as a private citizen with over 30 years experience in the Information and Communications Technology field.

With population growth, aided by climate change, virus and other pathogen outbreaks are expected to be more common. With globalisation and increased global travel, pathogen outbreaks more easily become pandemics.

While pandemics need to be understood as a fact of life, our response to pandemics and the various costs of those responses are policy choices. There are emergency preparedness plans with considerable resources, including preparedness drills, for other types of threats such as war, terrorism or school shootings. This has not yet been the case for pathogen outbreaks or pandemics.

It seems our societies are quite willing to allocate resources to protect ourselves from fellow humans, but not from other threats.

While I believe mandatory social distancing is required to reduce the health impacts of outbreaks and pandemics, the cost of emergency measures to the economy and other aspects of society (including those waiting for surgeries, or afraid to go to hospitals) are largely due to the lack of preparedness. It is the failure to prepare that is costing the economy. The results are expected to be quite extreme, with some experts predicting that the economic impact alone may be comparable to the Great Depression.

I believe this high cost could have been avoided.

¹ Study details at:

<https://www.ourcommons.ca/Committees/en/INDU/StudyActivity?studyActivityId=10819646>

² Russell McOrmond, residing in Ottawa since 1987.

Policy choices

In early April I sent a letter to David McGuinty, my MP in Ottawa South, offering my support for Universal Basic Income (UBE) and infrastructure spending as a longer-term response to this pandemic. I have been concerned that public spending has not been as focused as it could be.

What COVID-19 has made obvious is that Canada lacks infrastructure when it comes to public science and public health, as well as better communications infrastructure. This refers not only to better competition in urban environments, but also provision of equitable services to rural residents. This would be based upon a divested public utility model for the last mile, and a fully competitive model for other services.

As this is a submission to INDU, I will focus on communications infrastructure.

Complete the digital transition

During this pandemic communications infrastructure was declared an essential service. Being able to replace physical communication with Internet-based communication is critical to the physical (“social”) distancing request. Many have learnt how poor their Internet connections are when there are multiple people in the house competing for use of what telcos have convinced us is “scarce” Internet bandwidth.

Teleconference systems (such as webex, zoom, JITSI, gotomeeting, etc.) are providing what appear to be essential services, and require properly engineered and regulated networks. Previously, this level of services was limited to analog-era telephone lines. But, there is no longer any clear separation between communications infrastructure which is essential, and less essential services which run “over the top” (OTT) of that infrastructure.

During the analog-era, communications infrastructure using analog technologies needed to be purpose built. Into our homes we had wires for two-way voice communication (telephone), and another set of wires for one-way audio-video communication (Cable television, AKA: a Broadcast Distribution Undertaking or BDU), with similar purpose-specific allocations of wireless spectrum.

With digital technology the OSI layered approach³ upon which nearly all digital communications technology is modelled allows for structural separation such that the underlying layers of the

³ Open Systems Interconnection model (OSI model) is described on Wikipedia at https://en.wikipedia.org/wiki/OSI_model . On my personal blog I often write about policy failures relating to the lack of use of the OSI model in policy discussions: <http://mccormond.blogspot.com/search/label/OSI%20model>

network can be treated as a utility like every other connection into our home or offices, and the services that run over-the-top can be regulated appropriate to each specific service. It is that underlying utility which is the essential service, not every OTT service.

Using a layered model for road transportation as analogy

In 1994 the federal government formed the Information Highway Advisory Council (IHAC). Discussing roads and highways is an appropriate analogy to communications technology as it exposes the layers and complexity of the network, even though road transportation is simpler and less flexible than digital communications networks.

A simplification of layers built on road infrastructure might be:

- Road infrastructure. This is comparable to the physical network layers.
- Vehicles run "Over The Top" of those roads. This is comparable to physical devices connected to the communications network. Not all vehicles on actual highways are treated equally: Ambulances are given priority, while trucks pay a higher tax due to the increased wear they cause on the infrastructure. Yet, anyone may operate a delivery service.
- Drivers control the vehicles. This would be comparable to software authors, where software is the instructions that drive digital devices. (Note: It is software that differentiates between TCP/IP and other networking protocols. ISP's are businesses that run their own devices and provide transport of packets encapsulated within TCP/IP.)
- Passengers and parcels which would be placed in/on the vehicles for transport. This is comparable to the applications which use the network (two way or one-way audio/video/text/etc communication)

With transportation the roads are a mixture of municipal, provincial and federal management. Private roads including **driveways** connect to publicly managed infrastructure, but we don't allow specific (OTT) companies (say, Canadian Tire) to own and claim the right to control traffic over core infrastructure. For instance, if Canadian Tire Trucks were to claim priority over the 400 series of highways, at the expense of HomeDepot trucks, we could consider that a market failure. If such a thing were to occur because of an alliance between the 407ETR and Canadian Tire, then it would trigger the competition tribunal to investigate. Such a conflict of interest would be obvious. While publicly owned vehicles exist, private (corporate and individual) vehicle ownership far exceeds public. Individual citizens are allowed (in many ways actively encouraged) to personally own and drive vehicles.

If we use this road transportation analogy to go through various policy discussions the failures becomes more obvious⁴.

Understanding what is Over The Top

When I use the term "over the top" (OTT) I mean it in a technological sense, not as used by the lobbyists from the analog-era incumbents. Services which operate above OSI layer 2 (or some talk of layer 2.5 as technology has advanced) are considered OTT no matter which entity is providing those services.

It is important to understand that there is actually no "other" way anymore. The Public Switched Telephone Network (PSTN) that consisted of SS7 and T1 lines, and switched by devices from companies like Nortel, is gone. All voice communications within the backbone of the voice network is based upon packet switching, rather than circuit switching.

This means that telephone service offered by Bell Canada and BDU services offered by Rogers are **OTT services**. They run over-the-top of Bell and Rogers' commodity networks, using the same fibers, and often the same (IP) switching equipment as public Internet traffic. (That doesn't mean they are connected to the Internet). Unfortunately policy makers have further privileged the analog-era incumbents by claiming that BDU services offered by Bell Canada or telephone service offered by Rogers aren't OTT, even though they are just as much OTT as when those services are provided by any other company. In particular, the last mile voice connections offered by cable companies like Rogers use VoIP technology, and all LTE voice (since "4G") are VoIP connections, usually IPv6 links. These LTE links use private/privileged Bearer Channels unavailable to MVNOs to offer glitch-free communications.

We must adopt structural separation to ensure that appropriate public priorities are the focus of any of the underlying utility infrastructure. We also need to disallow the continued privileging of specific OTT brands who were given advantage during the analog era. They must no longer be allowed to use money (including a considerable amount of public money, often via the "rural broadband" initiatives) intended to enhance the utility infrastructure to instead subsidize their OTT services. We also must regulate each individual OTT service appropriate to the service, not allowing vertically integrated companies to circumvent this regulation⁵.

⁴ Hiding OSI layers leading to policy failures: Net Neutrality, Encrypted Media
<http://mccormond.blogspot.com/2017/12/osi-model.html?m=1>

⁵ Using the technological meanings of OTT, Bell's FiveTV is a "new media retransmitter" as excluded by section 31 to be granted the copyright exceptions granted to BDU's. This was added by Bill C-11 passed in 2002 specifically to disallow competing OTT services to be established in Canada. We would have had a Canadian Netflix-like service before the US service emerged had the federal government not blocked this innovation.

As many people have learned during the lock-down, their VPN connections that ought to be “across” town, are often travelling thousands of kilometers to Toronto and back, because the incumbent providers are thinking like BDUs rather than utility companies.

Never cross-subsidize a non-essential service from an essential service

Prior to the pandemic the Standing Committee on Canadian Heritage, as well as other policy makers, were contemplating a cross-subsidy where fees intended to pay for core communications infrastructure would be subsidizing the creation of entertainment content. This is clearly a cross-subsidy of a non-essential service from an essential service.

Policy must be focused on providing subsidies to essential services, not extracting funding from essential services or increasing the costs of essential services.

Rural broadband

Rural areas will have been harder hit by the response to the pandemic because of poor communications infrastructure. With digital-era structural separation it would be the rural municipalities and communities themselves that set policy priorities for their communications utilities. While both provincial and federal governments should be providing assistance as they do with other infrastructure projects such as transportation, the ownership should remain in the hands of the municipalities as happens with transportation.

The importance of rural broadband has been discussed by this committee fairly regularly, so I likely do not need to repeat the importance.

Report 11 from the 2018 study⁶ specifically included on page 19 the advantage of the communications infrastructure being planned by the appropriate level of government as part of transportation infrastructure, so that transportation infrastructure isn't dug-up to install communications infrastructure.

We should consider revoking the right-of-way privilege to communications incumbents via the existing CRTC regulations on fiber construction companies, as it is only the appropriate levels of government that should own the infrastructure under the ground, and on utility poles on public and private property. If a private sector entity wishes to lay cabling, they should have to negotiate with the land owners and pay appropriate ongoing rental fees for the use of the land. The incumbents seem to enjoy a privileged level of access to municipal permit processes, and in cases where another company has laid fiber, have in some cases managed to delay, or take over builds.

⁶ <https://www.ourcommons.ca/Committees/en/INDU/StudyActivity?studyActivityId=9604427>

Report 18 from the 2019 study⁷ of M-208 specifically highlighted the importance of communications infrastructure during a crisis, as we are learning first-hand less than a year later.

While there have been successes such as CTAL⁸, bringing together municipalities in the Antoine-Labelle regional county municipality, this needs to become the default scenario and not an exception. The federal government is promising money to rural broadband projects.⁹ These projects need to be post-digital-transition projects where the utility layer of the infrastructure are owned by the appropriate level of government, and a properly competitive marketplace of OTT services can exist. Such a thing has existed for some time in Alberta via the Alberta SuperNet system.

Summary

- Digital networking has separation between layers of a network stack in a way that analog communications technology did not. Public policy must take this fundamental difference into account.
- As an essential service during emergencies, and essential for the modern economy, the lower levels of the network must be treated as a utility managed by the appropriate level of government.
- Governments managing this utility reduces costs as communications become part of transportation, water, sewer, electrical distribution, and other infrastructure projects. This avoids the need to dig multiple times, but also makes sure that growth occurs in ways that municipalities have planned.
- Governments managing this utility allows local governments, rather than distantly headquartered private sector companies (with unseen conflicts of interests), to set infrastructure priorities that meet critical public policy needs. This is especially important in rural and remote settings.

⁷ <https://www.ourcommons.ca/Committees/en/INDU/StudyActivity?studyActivityId=10615403>

⁸ Près de 800 personnes découvrent la fibre optique avec CTAL, Mai 17, 2018
<https://ctal.ca/batisseur-avenir-haute-vitesse/>

⁹ Government will accelerate rural broadband funds, details to come 'soon,' says Monsef (By Anja Karadegilja, MAY. 1, 2020, Hill Time,
<https://www.hilltimes.com/2020/05/01/government-will-accelerate-rural-broadband-funds-details-to-come-soon-monsef/246473>