Operational Considerations for Network Operators during pandemics

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Image sources:
https://www.bol.com/nl/p/pandemic-nl-bordspel/9200000028227197/
Agenda

• Supply chains
• Projects that require multiple people
• Your own staff
• Remote hands
• Change management
• Recommendations
What do we know about SARS-COV-2 / COVID-19?

• No vaccine
• No medicine
• No quick tests
• Physical distancing helps:
  • Because whoever you meet, you don't know who they met
• Two week quarantine seems to be effective (but is a costly long test)

Conclusion: groups of people should be avoided
Internet stability

Turns out many critical things depend on Internet, even medical gear X-Ray scanners!

“I recently had to reschedule an X-ray because the license manager for the X-ray machine was acting up. I don’t think people have a grasp for how much of the medical infrastructure no longer works when the Internet is down.”

Supply chains

• Many router components (line cards, fabric cards, power supplies) are assembled by hand in production lines
  • Many factories are closed because we can’t have gatherings of people
• Line cards are rarely made in same country as where you want to use them
  • Equipment has to be shipped across multiple borders, but border staff is probably reduced at each hop due to COVID-19
• Heavy equipment shipments need specialized gear to move it around, or multiple people to lift it up
  • Again challenging, since society is now understaffed
Small crew work: Imagine refitting a POP deployment

• You’d like to install new big routers in rack or cage adjacent to old deployment… but lifting heavy gear often requires multiple people:
  • big no no! 😞

Advice: consider that all work to be done must be with the capabilities of a single person

Photo source: https://www.glassdoor.co.uk/Photos/Future-Horizons-Office-Photos-IMG4064390.htm
Subsea Cable work

• From “Diamond Princess” we learned ships are not the best place to be on if one of the guests is infected
• There are only a few cable repair ships, they’ll stay on sea for months on end (which currently protects them from COVID-19 hopefully!)
• Crew swaps & subsequent quarantine are going to be tricky

You can check where ships are! https://www.vesselfinder.com/vessels/RESPONDER-IMO-9236509-MMSI-538001582
Your own staff

• Given physical / social distancing, your own staff **should not be in offices**
• All conferences / tradeshows are cancelled
• Many NOCs have moved to a “work from home” approach
  • Benefits: level playing field, NOCs can now hire anyone globally!
• It would be irresponsible to fly your own crew out to do installs
  • Airports or customs could be crowded
  • Many airlines stopped flying
  • Many trains are not running either

*Advice: keep your people home*
Remote hands

A datacenter may only have a few remote hands staff:

• Are those still available? Or are they sick at home?
• Quite some DCs have requested that customers only visit the DC if the need is very urgent

*We should assume a datacenter’s remote hands service is degraded: less people available which can result in delays*
What changes are still responsible?

Marco commented on NLNOG’s mailing list:

"""Can I maybe add "postpone all non-critical maintenance"?

If it ain't broke, don't try to fix it. So unless you are adding capacity to support those working from home, you probably do everybody a big favour if you don't touch anything unless there is an outage or something you know for sure will cause an outage soon.

Stability is key here."""

Source: http://mailman.nlnog.net/pipermail/nlnog/2020-March/002916.html
It appears there are less BGP issues on the weekends!

Graph by Job, data source: https://puck.nether.net/bgp/leakinfo.cgi/
Network stability: preventive measures

• For EBGP
  • Maximum Prefix Limits
  • AS_PATH filters (peerlock)
  • IRR based filters
  • RPKI Origin Validation!

• For systems:
  • Keep applying security updates?
• Keep deploying TLS, DNSSEC, etc

Consider **continuing** projects that improve your (routing) security posture. But, postpone cosmetic work?

How do we decide what is critical and what is not?
Network stability: reactive measures

• Receive alerts with BGPAlerer [https://github.com/nttgin/BGPAlerer](https://github.com/nttgin/BGPAlerer)

• Pmacct for insight in traffic flows / capacity planning: [http://pmacct.net/](http://pmacct.net/) (or sign up for Kentik, Deepfield?)

• Feed your network’s view into the global collection efforts:
  • [Routeviews], [RIPE RIS], [NLNOG RING LG]
  • Feeding the collectors helps everyone understand routing incidents and construct post-mortem reports (or think about preventive measures!)

• Set up BGP route collection in your own network:
  • BMP / MRT dumping using FRR / BIRD as IBGP peer of all your edges
The bleak future

If we assume COVID-19 will be around for a while (multiple months) and social distancing is the most effective measure we have currently:

• Significant growth in Internet traffic: [Louis’ blog post](#)
• Line cards will fail and not be replaced: congestion on other paths
• Fibers will break (mud slides, shunt fault, digging accidents). Repairing the damage might be severely delayed: congestion on other paths
• VPNs will be open all day: move to per-app authentication (See Chris Morrow’s [NANOG post](#))

Many companies can’t grow at the moment!
Recommendations

• Continue changes focused on **improving stability**
• Upgrade employee’s home internet connections (add 4G backup?)
• Assume you can’t add capacity, so you have to repurpose remotely
• Do artificial rate limits still make sense? Are restrictive peering policies still productive? Can you open the pipes?
• Work-from-home is the new norm, so consider you can now hire globally!
  • May make ‘follow the sun’ or 24/7 coverage easier compared to manning a single office 24/7 in one city!
DON'T PANIC.