

Operational Considerations for Network Operators during pandemics

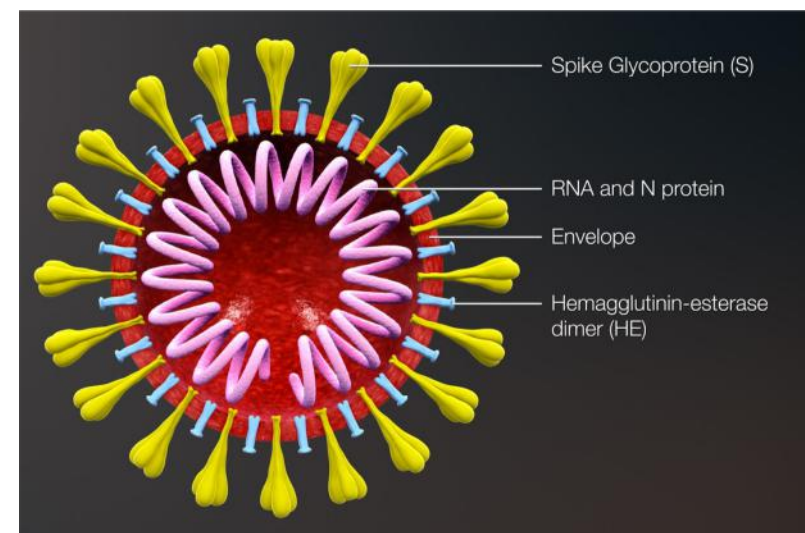
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Image sources:

<https://www.bol.com/nl/p/pandemic-nl-bordspel/9200000028227197/>

<https://www.inquirer.com/health/coronavirus/coronavirus-covid19-antiviral-cure-antibiotic-20200318.html>



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.”

Source: <https://mailman.nanog.org/pipermail/nanog/2020-March/106459.html>

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



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



TECO Responder Cable ship (Source: <https://www.hawaiki.co.nz/>)

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 / tradeshow 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?

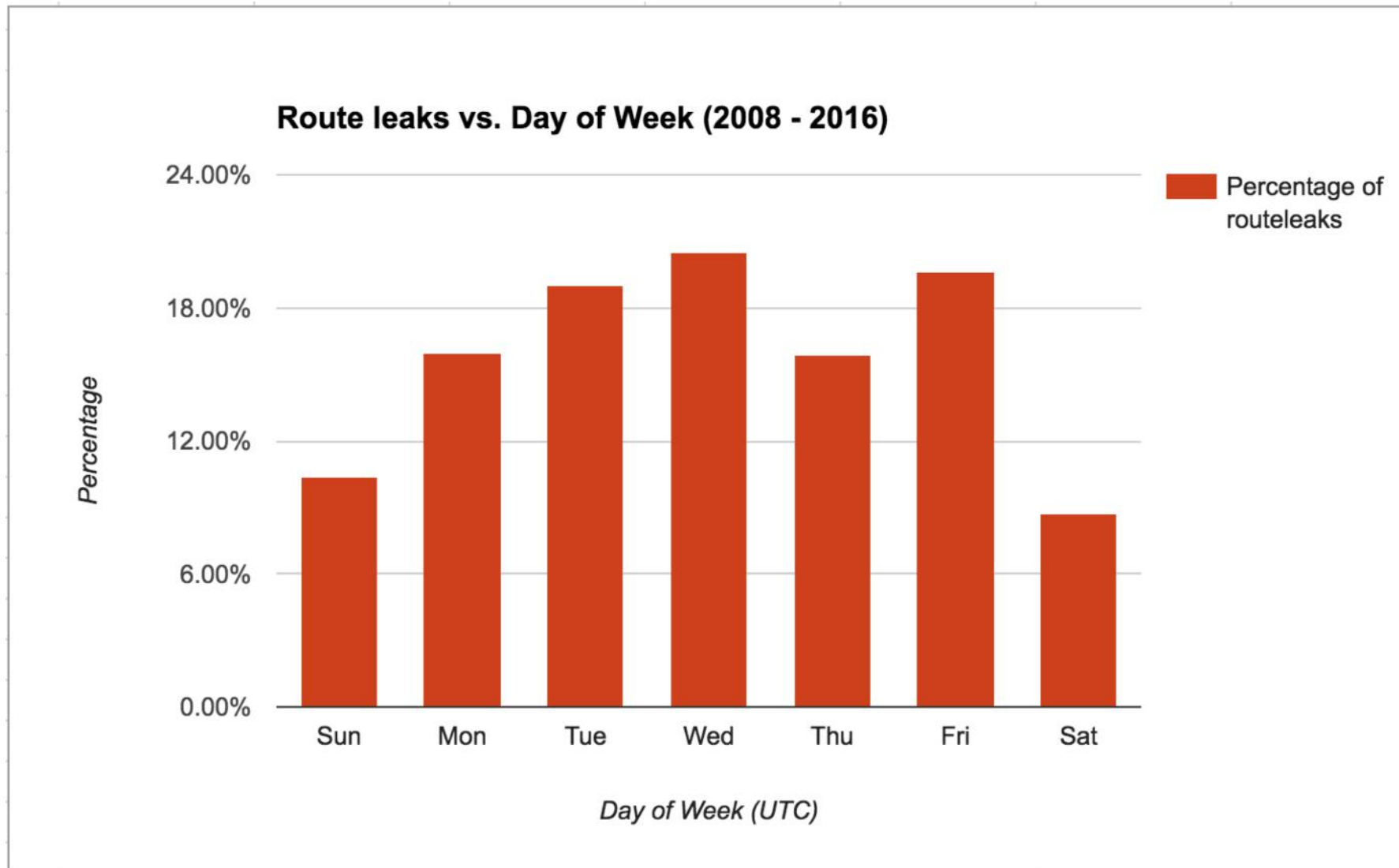
Marco commented on NLNOG's mailing list:

""""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.""""

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 BGPAlerter <https://github.com/nttgin/BGPAlerter>
- Pmacct for insight in traffic flows / capacity planning: <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!

