# Recovering from an internet Disaster

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**SUBMARINE CABLES BREAKAGE THAT CUT OFF A COUNTRY FROM THE INTERNET**

# TONGA CABLE LTD
# SUBMARINE CABLES BREAKAGES

OVERVIEW

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# Tonga Cable Ltd – Background

- Tonga Cable Limited is a submarine cable company in Tonga with the government of Tonga as the majority shareholder.

- The company was established to operate a submarine cable network launched in 2013 consists of a single pair fiber connecting Tonga to Southern Cross Cable network (SCCN) in Fiji. (International cable)

- In 2018 the network was extended to include the other two main islands in Tonga, the Vava'u and Ha'apai islands. (Domestic cable)

- So far, the network has suffered two major breakages. The first in 2018/2019 and again at beginning of this year.

# Tonga Cable Ltd – Network overview

- Submarine cable network has 4 Main sites

- TCL has equipment in Sydney (Equinix DC), and capacity from Suva Fiji to Sydney is leased (IRU) from SCCN.

- The outer islands (Vava'u and Ha'apai) shared a single cable with a branching unit in Ha'apai.
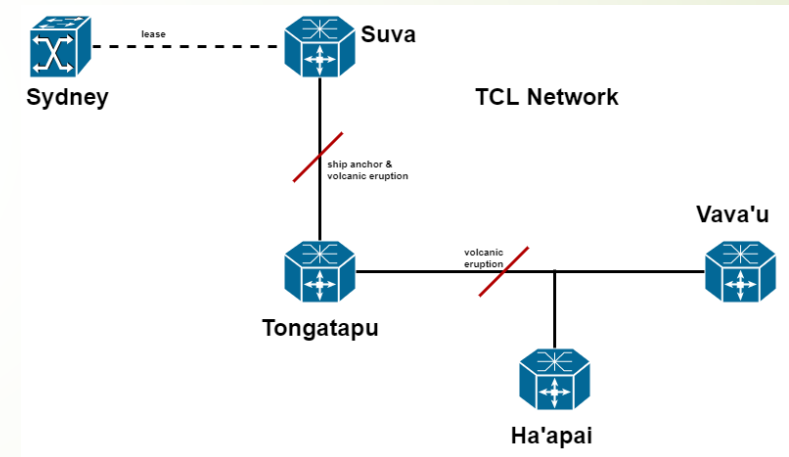
# Cables breakages - Summary

- In January 2019, a ship anchored at the entrance to Nuku'alofa harbor, drag and brake both of the International and domestic cables

- Due to shorter length of the cables affected and being close to shore, the repair ship quickly traced, identified and repaired both of the cables within 2 weeks.

- This year, due to the Hungas (HTHH) volcanic eruptions and subsequent waves. A large portion of both of the international and domestic cables were destroyed.

- The cable ship first repair the international cable to restore high speed Internet to the country.

- The damage to the outer islands cable were too extensive and was put on hold. Repair work for the domestic cable will resume when the replacement cable is ready

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# Cable Breakages – Effects on the country

- Shutdown all high speed communications (telephone, mobile and Internet)

- Cut off usual communications to the outer islands and overseas

- Affect overseas travel, embassies cannot process visas as usual which causes anger and frustration toward the government and telecom companies

- Many companies suffers financially since they cannot provide services to their customers as usual

- Import was affected which causes increase in prices of certain products. (Food etc.)

- Political upheaval as politicians and the public pointing fingers at each other (i.e. find someone to blame or take advance of the situation for political gain).

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# RESTORE SERVICES
# AND
# CHALLENGES

# Cable Restoration Procedures

- Tests and examines to confirm cable breakage (conduct by standby engineers)

- Inform Management and stake holders.

- Inform partners (local customers, BGP peering partners etc.)

- Establish communications with cable repair ship and cable support.

- Conduct fault location tests and pass the results to the cable repair ship.

- Constant communications with the cable ship to help identify and repair the cables.

- Final network testing and reactivation of the network (BGP sessions, MPLS tunnels etc.)

- Inform partners, customers and other relevant stake holders.

- Resume normal network operation

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# Cable Restoration Challenges

- Using satellite modem is expensive and slow which can further delay the recovery process.

- Lack of backup links was a major hindrance. The first incident in 2018/2019, the government was able to provide a satellite terminal to use for the recovery process. In the second incident, we had no choice but to use a BGAN satellite mobile terminal with lower bandwidth.

- Delays are expected as some processes are beyond our control, which can lead to frustration due to internal and external pressures to restore services.

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# LESSONS LEARNED

# Lesson Learned – Backup is vitally important.

- Having a backup link to the Internet is vital.

- Having backup link for the management system is vital.

- Having a backup link would save money in the long run.

- There should be sufficient backup bandwidth to cover customers essential services.

- Cost consideration for backup links discourage most organizations from having one but it's vital especially if the network, for one reason or another cannot or do not have redundancy built in.

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# Lesson Learned – A well rehearsed, documented recovery procedures

- Support documentation – procedures for contacting supports, who to contact, in time of emergency

- Well documented testing procedures – for instance, how to test for breakages, which tool to use, how to locate the fault or break and so on.

- Well documented network procedures. How to confirm the network is down or up. How to de/activate BGP sessions etc.

- Having good documentation can be used as references by current staff but also for training new staff.

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# Lesson Learned – Experienced engineers

They need to:

- Understand what to do in case of emergency (communications & reporting procedures, testing procedures etc.)

- Able to use the tools in each stage of the recovery process to troubleshoot and report, or fix faults.

- Able to document and report statuses of the recovery processes.

- Understand the network and/or systems and able to work with support and relevant partners to troubleshoot and recover systems or links

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# Lesson Learned – Having updated support contract is important

- Having an updated support contract for systems and networks is important

- Having the right support contract is also important. You want support that is reachable and active anytime you have emergency.

- Having the right support can make a huge different especially in disastrous situations that you have little or no control over.

# Lesson Learned - Communications

- Transparency regarding the problem

- Only provide as much information as necessary

- Do not speculate. (For instance, on how long it would take to fix, caused of the problem, etc.) It will only cause more confusion and anger.

- Streamlined communications with stake holders and the public. Multiple sources confuses people which may led to more anger and frustration

# CONCLUSION & QUESTIONS

# Conclusion

- Backup, backup, backup.

- Well documented recovery process.

- Having skilled and experience engineers is vital.

- Good communications (with stake holders, customers and the public) is important especially now ICT is an integral part of most societies.

- Major ICT problem today, can have major economic, social and political impact on a country.

# Thank You.

# Any Questions?