Network Resilience in Trinidad and Tobago Technical Proposals

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Outline

- Introduction
- Network Threats
- Network Resilience Proposals
- Authority's Initiative

Introduction

The Telecommunications Act 2001, as amended in 2004 (Chapter 47:31)

- Created the Telecommunications Authority of Trinidad and Tobago (TATT)
- TATT responsible for regulation of telecommunications, broadcasting and resource management (spectrum and numbers).

Introduction

TATT's Mandate

"… to guide the sector's transformation from virtual monopoly, in which Telecommunications Services of Trinidad and Tobago is the principal provider of telecommunications services, to a competitive environment,

to monitor and regulate the sector so transformed and, in particular,

to prevent anti-competitive practices."

- Preamble in Telecommunications Act

Introduction

Objects of the Telecommunications Act

- To create an open market, including conditions for fair competition and the national and international levels.
- To facilitate the orderly development of a telecommunications system that services to safeguard, enrich and strengthen the national social, cultural and economic wellbeing of the society.
- To promote and protect the interests of the public.
- To promote universal access to services.
- To encourage investment in and the use of infrastructure to provide services.
- To regulate broadcasting services consistent with the provisions of sections 4 and 5 of the constitution.

- Objects of the Telecommunications Act

Introduction

Technical Standards

Section 45 of the Telecommunications Act states

'(1) Subject to the other provisions of this Act, concessionaires and licensees may implement such technical standards as they deem appropriate and which are in conformity with accepted international standards.'

(2) Notwithstanding subsection (1), the Authority may identify, adopt or establish preferred technical standards.'

Introduction

Interconnection

Sections 25 and **78 (f)** of the Telecommunications Act Chap 47:31 hereinafter referred to "the Act", empowers the Authority to manage Interconnection through

- ensuring compliance to guidelines and standards established by the Authority; and
- the enactment and enforcement of the Telecommunications (Interconnection) Regulations, 2006, hereinafter referred to as the "Interconnection Regulations".

Introduction

Interconnection

- The Authority has also developed a draft **Standards and Guidelines for Interconnection and the Development of Reference Interconnection Offers**, which will accompany the revisions to the **Interconnection Regulations**.

Network Threats

Disasters are sudden occasions that seriously disrupt social routines, cause adoption of unplanned actions to adjust to the disruption, and endanger valued social objects. They are defined by human casualties, property damage, and severe social disruptions.

Source: Final Report ITU-D SG 2 Question 22-1/2 Utilization of Telecommunications/ICTs for Disaster Preparedness, Mitigation and Response 5th Study Period 2010-2014

Network Threats

ITU-T Recommendation L.81 gives the following definition: “Disasters are characterized by the scope of an emergency. An emergency becomes a disaster when it exceeds the capability of the local resources to manage it. Disasters often result in great damage, loss, or destruction.”

Source: Final Report ITU-D SG 2 Question 22-1/2 Utilization of Telecommunications/ICTs for Disaster Preparedness, Mitigation and Response 5th Study Period 2010-2014

Network Threats

- **Man-made Disasters;** for example, unauthorised excavation and damage to underground ducts and cables

- **Natural Disasters;** Earthquakes, Hurricanes (Strong Winds), Floods, Bush Fires, Landslides, Lightning Strikes

Network Threats – Fixed

Both Man-made and Natural Disasters can adversely affect Fixed Switching and Transmission Networks, Points of Interconnection (National), International Gateways, Outside Plant Facilities and Buildings.

In the event of a disaster, the number of phone calls can hugely increase, resulting in an overload of the network.

Network Threats – Outside Plant

Natural Disaster	Effect on Outside Plant Facilities
Bush Fires	Burning of wooden telecommunication poles. Burning of aerial cables. Damage to cabinets.
Landslides	Destruction of underground conduits.
Lightning Strikes	Burning of aerial cables.

Source: Recommendation ITU-T L.92 (10/2012)

Network Threats – Outside Plant

Natural Disaster	Effect on Outside Plant Facilities
Hurricanes/Strong Winds	Falling of poles. Disconnection of aerial cables.
Floods	Penetration of water into manholes. Damage to underground ducts and cables.
Earthquakes (dependent on the magnitude of the earthquake)	Disconnection of aerial cables – the destruction of all outside plant facilities. (dependent on the magnitude of the earthquake)

Source: Recommendation ITU-T L.92 (10/2012)

Network Resilience Proposals

- So how can we mitigate these effects?

Network Resilience Proposals

Points of Interconnection (POI)

- Concessionaires should have two physically diverse POIs available.
- Each POI should be engineered with two (2) physically separate cable entrances.
- Each POI building should be designed to be resistant to earthquakes up to 6.5 on the Richter Scale.
- Facility should have Standby Power (redundant generators and UPS) available with sufficient on-site fuel storage facilities to last one (1) month.
- Requisite Fire Suppression Systems should be installed.
- Adequate Physical Security Systems should be in place.

Network Resilience Proposals

Core Switching and Transmission Networks:

- Concessionaires should have redundant Transmission Systems deployed with two physically diverse paths equipped with Automatic Protection Switching, linking Core Switching Nodes.
- Each Node building should be engineered (where possible) with two (2) physically separate cable entrances.
- Each Node building should be designed to be resistant to earthquakes up to 6.5 on the Richter Scale.

Network Resilience Proposals

Core Switching and Transmission Networks

- Facility should have Standby Power (redundant generators and UPS) available with sufficient on-site fuel storage facilities to last one (1) month.
- Requisite Fire Suppression Systems should be deployed.
- Adequate Physical Security Systems should be in place.

Network Resilience Proposals

Outside Plant Facilities:

- The Authority's work in this area will be guided and informed by the ITU Handbook on Telecommunication Outside Plants in areas frequently exposed to natural disasters (online edition 2013).

- **Local Issues**

1. Many densely populated communities suffer from limited road reserve, making the deployment of underground duct facilities expensive, as actual roads have to be re-instated after ductworks.
2. Inadequate road reserve presents challenges for providing extra supports (for example guy wires) on poles.

Network Resilience Proposals

- **Local Issues (continued)**

  3. The practice of pole sharing between power distribution and telecommunication companies. Poles supporting heavy transformers are more susceptible to failure under stress conditions.

  4. Recently the local newspapers reported an incident where a truck actually pulled down a concrete pole on to a vehicle. The vehicle was crushed. Fortunately no one was injured.

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Authority's Initiative

Second International Cable Landing Point and Station

Authority's Initiative

Cause for Concern – Single (Geographic) Point of Failure:

- All International Fibre Optic Cables for Trinidad and Tobago land at one (1) popular beach on the North Coast.

- Three major International Cable Landing Stations are all located in the same general area, a few kilometres from where the cables arrive on-shore.

- There is only one (1) two lane road into and out of that area. The underground duct route is owned by one operator. There is limited road reserve on some parts of the route and bush fires have been an issue in the past.

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Authority's Initiative

Second International Cable Landing Point and Station

- Significant aspects of the project include funding, governance, economic viability, environmental risks, conceptual design as well as regional coordination.

- The implementation of this project will provide diversity for the existing international Cable Landing Stations in Trinidad and Tobago.

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Thank you

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