

Kaieteur Fall, Georgetown, Guyana
Photo Credit: Emily-Kydd

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Mission

Influence the innovation and development of ICT solutions for the benefit of members by developing, navigating and leveraging relationships with all stakeholders. Advocate for policies, legislation and rules which advance the creation of an environment which facilitates the deployment of services and technologies around the region.

Vision

To become the leading authority in shaping information, communication and technology in the Caribbean and the Americas.

Objectives of Cancion

To inform CANTO's membership of information and communication technologies and policy developments taking place in the member organizations of the association.

To reach policy makers of the Caribbean, sharpening their awareness of regulatory developments and technological progress as it affects the region.

To provide CANTO with a literary voice to reach others in the region and internationally, with news, information and analysis of information and communication technology developments in/or affecting the Caribbean.

If you or your organization are engaged in or informed about activities or developments which impact upon Caribbean information and communication technologies please write and let us know.

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We are alive at a time that is inarguably, one of the best times in human existence. Never before have we, as a species, had so many inventions available to the larger society, to facilitate our ease of day-to-day living. However, simultaneously, never before has humanity and man's habitat, (Terra Firma) been so threatened with the possibility of annihilation; all by the hands of man.

Globally, Technology has been, and continues to be at the forefront of our onward march to "progress". We in this region have been commendably adept at keeping pace with the Technological advances of the wider world.

The international arena is migrating from the use of analogue and transitioning, almost entirely to digital applications in technology. Since technology affects all our lives, even at the most minute and mundane aspect; we as a region are being motivated to adapt entirely to digital technology.

Change is one of the few constants in life and therefore, to be successful at life it is imperative that we be adaptable to our ever evolving world. Similar to the Industrial Revolution, there would be transition pains. But in every aspect of life there are pros and cons.

It is a given that workers would be displaced and the region, in its entirety or the various sectors would need to examine, on whose shoulder would the moral responsibility lie to redirect the displaced workforce into acquiring new necessary skills, which will enable them to continue earning a living.

Regionally, there would require a need for us to revisit our education systems so that it complements the rapid pace at which technology is now advancing or we stand the chance of having a large segment of our populace being left behind. Our education system needs to be adjusted, so that students are schooled for a world where the nucleus is Artificial Intelligence.

As we were advised by Mark Prensky who coined the term in 2001; the world as we know it, is divided into two as it pertains to Technology. There are "Digital Natives: i.e. :-persons born after 1980, who were raised alongside developing technologies and therefore cannot envisage a world where they are bereft of their mobile phones and other technology devices.

They are so consumed by Artificial Intelligence that they have minimal desire for actual human interaction. Then, there are "Digital Immigrants" i.e.:- those of us born before 1980. Though a minimal number of us may have, or are on the way to becoming digital savvy. A large percentage lack the confidence in their ability to conquer the proper use of digital devices, and therefore remain aloof from the digital revolution. We are more in our comfort zone when dealing with people face-to-face, and may have distrust for computer applications. We would opt to live in a paper-based world, rather than one that is ninety percent digitized.

The conundrum for service providers in this situation is, how to successfully satisfy the opposing appetites and aptitudes for mobile and digital services of all customers.

In order for a Regional Digital Transition to be effective and successful, there would need to be a meeting of minds on the Telecommunication Providers level and the Governmental level.

Ideas will need to be well thought out, thoroughly planned, well-executed, measurable, and monitored every step of the way. It would also necessitate a culture shift or adjustment at both the individual and organizational level. Therefore there would need to be financial investments in outreach programmes in order to woo "Digital Immigrants". Resources would have to be also invested in re-skilling of the workforce, due to displacement.

The organizations that exhibit interest, care and attention in equipping "Digital Immigrants" with the ability to easily navigate digital applications are the ones that will retain and even gain new customers that would remain loyal in the years to come.

Guyana has always been blessed with an abundance of natural resources; namely - gold, silver, bauxite, uranium, beautiful rain forests and a magnificent supply of fresh water due to its many rivers and waterfalls, most notably Kieteur Waterfalls, the world's largest single drop waterfall. However, with the unprecedented discovery of oil by Exxon Mobil, seven discoveries of which five are an estimated 3.2 billion barrels. Its economy is about to skyrocket, with official oil production due to commence by March, 2020.

Guyana's economy is forecasted to equal that of its Caricom neighbour –Trinidad and Tobago by mid-2020. On February 7, 2018 at the inaugural Guyana Petroleum Business Summit and Exhibition (GIPEX), Minister of Natural Resources Raphael Trotman, in his opening remarks at the Marriot Hotel in Georgetown, advised that Guyana must prepare for "unprecedented business activity" as the oil and gas industry continues on its "fast and furious trajectory" for oil production come 2020.

January 2019 would be a red-letter month for CANTO, as we celebrate a milestone of 35 years. We, together with one of our founding members- Guyana Telephone and Telegraph Company (GTT) will co-host our 35th Annual General Meeting and Mini Expo at the Guyana Marriot Hotel, Georgetown, Guyana, on 27th - 30th January, 2019. We are expecting to welcome over 200 C-Level CANTO members and stakeholders in the ICT sector from over 30 countries.

"Transitioning to a Digital Region -Opportunities and Threats" is the theme by which the conference segment will be guided. The Telecommunication Industry stands at the forefront of this transformation, doubly as an industry witnessing large-scale change in its market environment and as a key driver of world digitization.

Deliberations along the theme will contribute to improvement both regionally and globally through harnessing of the resultant added value obtained from the

digital transformation, on both the business and societal level, while identifying the possible challenges needed to be overcome so that premium customer value can be delivered in an equalized, digitally transformed ecosystem.

A pivotal aspect of this signature event is the Annual General Meeting which will afford members the opportunity to focus on the statutory obligations and chart the course of the Association for the 2019/20 financial year.

The Mini Expo will showcase emerging technologies from global suppliers, while a GSMA-led workshop will centre on "Unlocking Rural Mobile Coverage".

We cordially invite you to join us in ushering in this "Monumental Period" as we celebrate this prestigious event with GTT at the helm of Guyana with its emerging economy, which is expected to burgeon in the future. The transition to a digital economy is inevitable and GTT and CANTO is participating in this transformational event. We welcome you to be a participant in this historic event.

As we approach the end of 2018, which has been a very memorable year, both regionally and globally; we give thanks. We were blessed with an abundant outpouring of water from the heavens, more than we could comfortably utilize, which resulted in unprecedented regional and international floods. We experienced more than usual earthquakes in many areas.

There were also many positives on all levels. We are grateful for all our experiences and extend warm "thank yous" for all who are still with us on our journey forward. We extend heartfelt and warmest Yuletide Greetings to you and your loved ones and wish you a wonderful and prosperous 2019.

Estamos vivos en un momento que es indiscutiblemente, uno de los mejores momentos de la existencia humana. Nunca antes hemos tenido, como especie, tantos inventos disponibles para la sociedad en general, para facilitar nuestra vida cotidiana. Sin embargo, al mismo tiempo, nunca antes la humanidad y el hábitat del hombre (Tierra Firme) han estado tan amenazados con la posibilidad de la aniquilación; todo a manos del hombre.

A nivel mundial, la tecnología ha estado y sigue estando a la vanguardia de avance, “el progreso”. Nosotros, en esta región, hemos sido muy hábiles para mantenernos a la par de los Avances tecnológicos del mundo en general.

El ámbito internacional está migrando del uso de lo analógico y de transición, casi Completamente al uso de aplicaciones digitales en tecnología. Dado que la tecnología afecta a todas las áreas de nuestras vidas, incluso en el ámbito más minucioso y mundano; nosotros como región estamos siendo motivados a adaptarnos completamente la tecnología digital.

El cambio es una de las pocas constantes en la vida, por lo tanto, para tener éxito es imperativo que seamos adaptables a nuestro mundo en constante evolución.

Similar a la Revolución Industrial, sufriremos dolor durante esta transición. Pero en todos los aspectos de la vida hay pros y contras.

Es un hecho, que los trabajadores serán desplazados y la región, en su totalidad, o los diversos sectores tendrían que examinar, sobre que hombros caería la responsabilidad moral para redirigir a la fuerza laboral desplazada para que adquiera las habilidades necesarias, lo que les permitirá continuar ganándose la vida.

Regionalmente, sería necesario que revisemos nuestros sistemas educativos para que Este a tono con el ritmo acelerado al que avanza la tecnología o corremos el riesgo de dejar atrás a un gran segmento de nuestra población. Nuestro sistema de educación necesita ser ajustado, para que los estudiantes sean educados para un mundo donde el núcleo sea la Inteligencia Artificial.

Como nos aconsejó Mark Prensky, quien acuñó el término en 2001; El mundo, tal como lo conocemos, se divide en dos en lo que respecta a la tecnología. Hay “nativos digitales”, es decir: -personas nacidas después de 1980, quienes se criaron junto a tecnologías en desarrollo y, por lo tanto, no pueden visualizar un mundo en el que estén privados de sus teléfonos móviles y otros dispositivos tecnológicos. Están tan consumidos por la Inteligencia Artificial que tienen un deseo mínimo de interacción humana real. Luego, hay “Inmigrantes digitales”, es decir: aquellos de nosotros nacidos antes de 1980. Aunque un número mínimo de nosotros puede que tengamos, o estemos camino a convertirnos en expertos digitales. Un gran porcentaje carece de la confianza en su capacidad para conquistar el uso adecuado de los dispositivos digitales y, por lo tanto, se mantiene alejado de la revolución digital. Estamos más en nuestra zona de comodidad cuando tratamos con personas cara a cara y podemos desconfiar de las aplicaciones informáticas. Optaríamos por vivir en un mundo basado en papel, en lugar de uno que esté digitalizado en un noventa por ciento.

El dilema para nosotros como proveedores de servicios en esta situación es cómo satisfacemos con éxito los gustos y aptitudes opuestos para los servicios móviles y digitales de todos nuestros clientes.

Para que una Transición Digital Regional sea efectiva y exitosa, se necesitaría para ser una reunión de mentes a nivel de Proveedores de Telecomunicaciones y del Gobierno nivel. Las ideas deberán ser bien pensadas, bien planeadas, bien ejecutadas, medibles, y monitoreado cada paso del camino. También requeriría un cambio de cultura o ajuste tanto a nivel individual como organizativo. Por lo tanto, habría que hacer inversiones financieras en programas de divulgación para atraer a “inmigrantes digitales”. También se debe invertir recursos en la re-capacitación de la fuerza laboral, debido al desplazamiento.

Las organizaciones que muestran interés, cuidado y atención en equipar a los “ Los inmigrantes Digital” con la capacidad de navegar fácilmente las aplicaciones digitales son los que retendrán e incluso ganar nuevos clientes que seguirían siendo leales en los próximos años. Guyana

siempre ha sido bendecida con una abundancia de recursos naturales; a saber: oro, plata, bauxita, uranio, hermosos bosques tropicales y un magnífico suministro de agua dulce debido a sus numerosos ríos y cascadas, entre las que destacan las Cataratas de Kieteur, la mayor caída de agua del mundo. Sin embargo, con el descubrimiento sin precedentes de petróleo por Exxon Móvil, 7 descubrimientos de los cuales 5 son aproximadamente 3,2 billones de barriles. Su economía está a punto de dispararse, y la producción oficial de petróleo comenzará en marzo de 2020.

Se pronostica que la economía de Guyana será igual a la de su vecina Caricom -Trinidad y Tobago a mediados de 2020. El 7 de febrero de 2018, en la inauguración de la Cumbre y Exposición Empresarial del Petróleo de Guyana (GIPEX), el Ministro de Recursos Naturales, Raphael Trotman, en su discurso de apertura en el Hotel Marriot, en Georgetown, informó que Guyana debe prepararse para una “actividad empresarial sin precedentes”, como La industria del petróleo y el gas continúa en su “rápida y furiosa trayectoria” para la producción de petróleo en 2020.

Enero de 2019 sería un mes rojo para CANTO, ya que celebramos un hito de 35 años. Nosotros, junto con uno de nuestros miembros fundadores, Guyana Telephone and Telegraph Company (GTT), será co-anfitrión de nuestra 35a Reunión General Anual y Mini Expo en el Guyana Marriot Hotel, Georgetown, Guyana, del 27 al 30 de enero de 2019. Esperamos dar la bienvenida a más de 200 miembros de CANTO de nivel C e interesados en el sector de las TIC, de más de 30 países.

“La transición a una región digital: oportunidades y amenazas” es el tema por el cual se guiará el segmento de la conferencia. La industria de las telecomunicaciones se sitúa a la vanguardia de esta transformación, doblemente como una industria que es testigo de un cambio a gran escala en su entorno de mercado y como un impulsor clave de la digitalización mundial.

Las deliberaciones a lo largo del tema contribuirán a mejorar tanto a nivel regional como global, mediante el aprovechamiento del valor agregado resultante obtenido de la transformación digital, tanto a nivel empresarial como a

nivel social, al mismo tiempo que se identifican los posibles desafíos que deben superarse para que el valor del cliente superior se pueda entregar en un ecosistema ecualizado y transformado digitalmente.

Un aspecto fundamental de este evento distintivo es la Reunión General Anual, que brindará a los miembros la oportunidad de centrarse en las obligaciones legales y trazar el curso de la asociación para el año fiscal 2019/20.

La Mini Expo mostrará las tecnologías emergentes de los proveedores globales, mientras que un taller dirigido por GSMA se centrará en “Desbloquear la cobertura móvil rural”.

Le invitamos cordialmente a unirse a nosotros para iniciar este “Período Monumental”, ya que celebramos este prestigioso evento con GTT al mando de Guyana con su economía emergente que se espera que brote en el futuro. La transición a una economía digital es inevitable y GTT y CANTO están participando en este evento de transformación. Le damos la bienvenida a participar en este evento histórico.

A medida que nos acercamos al final de 2018, que ha sido un año memorable, tanto a nivel regional como mundial; damos gracias Fuimos bendecidos con un abundante flujo de agua de los cielos, más de lo que pudimos utilizar cómodamente, lo que resultó en inundaciones regionales e internacionales sin precedentes. Experimentamos más de lo normal terremotos en muchas áreas.

También hubo muchos aspectos positivos en todos los niveles.

Estamos agradecidos por todas nuestras experiencias y le damos un caluroso “gracias” a todos los que aún están con nosotros en nuestro viaje hacia adelante. Extendemos los más sinceros y cálidos saludos de Yuletide para usted y sus seres queridos y le deseamos un maravilloso y próspero año 2019.



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2019 Theme: Transitioning to a Digital Region: Opportunities & Challenges

Marketing & Communication Committee

Digital transformation is emerging as a key driver of sweeping change in the world around us. It has the potential to significantly improve consumer lives and create broader societal good, while providing businesses with new opportunities for value creation and capture.

The telecommunications industry is at the forefront of this transformation, both as an industry witnessing large-scale change in its market environment and as a key driver of worldwide digitization. Investment by the telecommunications industry in technology has underpinned an immense shift in information and capital flows through the global economy, while providing the building blocks for the emergence of entirely new business models across industries. In parallel, access to a globally connected network has empowered millions of people around the world, by giving them access to real-time information, marketplaces and social programs that will have long-term implications for quality of life.

It is clear that digitization will be a source of transformational change, but there are a number of challenges that need to be overcome. In many cases, the gains from digitization have been inequitable, with the benefits not reaching those who need them most. Further, Caribbean telecom providers still struggle with managing OTTs operating over their

networks without restriction and with continued growth in the digitalization of economies and societies OTTs will become more of a norm than a novelty.

The exponential increase in global information flows has also created new risks for data privacy and security. Businesses across sectors are grappling with challenges related to changing customer expectations, cultural transformation, outdated regulation and skill shortages, among others hence the need for meaningful discussions regarding the aforementioned issues.

Deliberations along the captioned theme will contribute to improving the state of our Region and by extension the world through the harnessing of the value added from digital transformation, both for business and society, while identifying the challenges to be overcome in order to deliver premium customer value in an equalized digitally transformed ecosystem.

Join us at the 35th AGM & Mini Expo Guyana Marriott Hotel, Guyana.



Paving The Way Towards Digital Transformation

Geraume Bor MSc.
Chief Technology Officer, Ictual N.V.

Recently the CANTO organization announced the theme for the upcoming event 'Transitioning to a Digital Region – Opportunities and Challenges'. It is curious to note that a similar theme decorated the walls of the Caribbean Association of Banks (CAB) annual conference just last month 'Banking in the era of Digitization: The new normal'. Many speakers gave their two cents on the threat of Fintech and the need for Digital Transformation. It was clear from the reactions from the audience that these are subjects that resonate through their organizations.

Is this topic also relevant for the Caribbean telecommunication community?

IDG's 2018 State of Digital Business Transformation indicates that 89% of surveyed organizations have adopted or plan to adopt a "digital-first" business strategy, with key investments in AI, big data analytics, cloud, IoT and mobility. However, only 19% believe they are disrupting the market with their transformation efforts. Actually, 69% admit that their efforts are "less than extremely successful".

A fair conclusion may be that implementing digital transformation technologies alone is not enough. There's a natural maturity that is not easily overcome by employing new technology. For example, successful Fintech companies rarely start with manual/paper based operations. Their business models required and were built on technological systems from the get go.

To say the least... we must acknowledge that these type of companies have delivered significant new value to the market, especially for consumers, through technology used effectively.

On the other hand, we must also acknowledge that this is not completely new. Many organizations have been using information and communication technology for a long time to gain efficiency, convenience for customers and to reduce cost. For example, most telecom service providers in the Caribbean have already implemented an online self-care portal and/or app and have automated some of their in-store experience.

However, there are still major challenges to overcome.

- Increasingly, consumers expect service to be easy to acquire and instantly delivered. The convenience they are experiencing in other service industries is not an 'edge' any more. It is a requirement when selecting a telecom provider.
- Operators have been plagued by regulation and market pull to keep up with increasing data demands causing millions in investments every year.
- Operators have their own disruptors as OTTs leverage the investment of the telecom operators while having to deal with minimal regulation.
- Cost of doing business increases while the customer base is diluting across operators as increasingly more customers have accounts spread across several services providers.

Solutions

Any solution to above challenges will include improvement in the areas of

- Customer engagement
- Service delivery & work automation
- Data & analytics

All of which are key value components of your digital transformation strategy.

So is there a path from traditional business to market disruptor? Or are we to close shop and start from scratch as a new tech-driven market disruptor?

Based on our experience Ictual proposes a three phased path for businesses towards Digital Transformation.

- **Digitization**
This is the process of making all your information accessible through digital media. It involves strategies to minimize and eventually eliminate



storage and creation of paper or otherwise analog documents. It reduces manual work, material costs and improves the quality of and time needed to find crucial information for your business.

- **Digitalization**

This is about making your digitized information work for you. Sometimes it involves streamlining work processes and procedures by employing digital collaboration and work automation tools. This process is a great opportunity to re-evaluate and organically improve your way of working and the artifacts being used to execute work. Other times it's about making your services more available and easier to use for your customers and suppliers. For example, by using an omnichannel approach to make customer touch points as seamless, frictionless, easy and enjoyable as possible.

Digitalization tools allow you to create effective interactions, easily collect and visualize data and work processes. They enable you to measure and monitor

performance and make changes with often minimal impact. You can learn and improve as you go.

- **Digital Transformation**

Once all your information is stored digitally you are able analyze this data to create new value for your customers through completely new or more personalized business concepts. Key factors are quality of data and the capacity to gain insights from it. For example: Are you collecting information about how your customers are using your mobile app or online portal? Are causes of complaints being recorded effectively? Application of technology towards a “data-first” strategy is very important at this stage, but it is initially more important to align your existing operation to be able to sustain the dynamics of your new digital adventure.

In closing I'd like to submit the following quote. *“90% of CEOs believe the digital economy will impact their industry, but less than 15% are using Digital Strategy”* – MIT, Sloan, Capgemini –



TELESUR...We Make An Impact!

As we commemorate 100 years of the end of WWI in November 2018 we realize how much economic growth has improved the lives of millions of people. Economic development has lifted so many out of poverty and has enriched lives quite profoundly. Yet economic development doesn't stand on its own. A society can't be successful unless it addresses basic human needs and provides opportunities for its citizens to improve their quality of life. This has been the basic philosophy of the government of Suriname, the main shareholder of the incumbent telecom provider, TELESUR. With economic setbacks in Suriname in the past years it has become paramount to develop strategies that can create opportunities for the population to increase their standard of living and accumulate wealth for the country as a whole.

This is where TELESUR enters the picture. As the biggest telecom provider in the country with a branch in Europe, TELESUR welcomed the challenge to become the enabler of a digital future in Suriname. With their e-Suriname strategy the road was laid to create opportunities for the development of e-services in the country thus enabling local businesses to thrive. However, this was indeed a challenge as the fixed copper infrastructure was already over 30 years old and was becoming an obstacle for the realisation of the dream of developing a digital economy.

That is the moment that the technicians at TELESUR hit the drawing board and started scouting for international partners with experience in this particular field of expertise. Enter Huawei Technologies Co. Ltd. Several designs were examined until a brilliant design of both fiber-to-the-curb and fiber-to-the-home solutions was developed. And in June 2017 the implementation of one of the biggest telecom projects for Huawei Technologies Co. Ltd in the Caribbean

commenced. It was dubbed 'TELESUR NATIONAAL BREEDBAND PROJECT' or TNBP which stands for Telesur National Broadband Project. This has thus far been the biggest ICT investment project in Suriname. We make an impact! Old copper infrastructure was replaced with fiber cable and additionally 253 multi-service access nodes were placed in the network. In October 2018 phase 1 – namely Fibre -to-the-curb – was completed. 35000 households have been successfully transferred to the new infrastructure which allows the population to experience higher bandwidth than previously possible. With a population of approximately 500,000 this is quite an achievement. In the meantime a staggering 260 kilometers (circa 261 miles) of fiber optics cable has been placed in the poles of the local electrical company through a splendid collaboration. This allows for a swift delivery time for the project.

This project is already starting to yield success. Local contractors are also seeing economic benefits of this project and customers are getting better access to faster Internet. Business is booming because of custom made solutions that can now be deployed in a timely fashion.

TELESUR is currently implementing phase 2 – namely, fiber-to-the-home – in green fields. These are areas currently lacking any fixed telecom infrastructure. This new telecom super highway will create possibilities for growth for the Surinamese and Caribbean community. ***Telesur is making an impact. Our people are making an impact. Suriname is making an impact.***



G Slicing: Concepts, Architectures, and Challenges

Amit Cohen
Senior Director,
Cloud Platforms Chief Principal Architect, NFV/5G/IOT at ECI.

Part 1: The beginning, what is slicing?

5G is expected to open up many new opportunities for service providers – of these we have talked in other blogs and articles. This blog series will focus on one of the most hyped and talked about technology enablers – Network Slicing. It is believed that network slicing will enable service providers to simultaneously accommodate the wide range of services, over a common network infrastructure.

Why Slicing?

Digitalization/softwareization of the network is one catalyst of network slicing. Technologies like Software-Defined Networking (SDN) and Network Function Virtualization (NFV), have already separated the data plane from the control plane. This separation of ‘elements’ provides the programmability, flexibility, and modularity that is required to create multiple logical (virtual) networks, each tailored for a given use case, on top of a common network. These logical networks are referred to as network slices.

Network slices is an end-to-end (E2E) logical networks running on a common underlying (physical or virtual) network, mutually isolated, with independent control and management, and which can be created, suspend and terminated on demand as well. Such self-contained, virtual networks must be flexible enough to simultaneously accommodate diverse business-driven use cases from multiple players, man or machine, across a variety of platforms.

But for proper slicing, one must first understand the basic facets of a network slices: Resources, Virtualization, Orchestration, Isolation and Autonomous Behaviour.

Resources

A network slice is composed of a collection of resources that, appropriately combined, meet the service requirements of the use case (or service) that the slice supports. One can differentiate between two types of resources:

Network Functions (NFs): functional blocks that provide specific network capabilities to software instances running on infrastructure resources, NFs can be physical (a combination of vendor-specific hardware and software, defining a traditional purpose-built physical appliance) and/or virtualized (network function software is decoupled from the hardware it runs on).

Infrastructure Resources: heterogeneous hardware and software for hosting and connecting NFs. They include computing hardware, storage capacity, networking resources (e.g. links and switching/routing devices enabling network connectivity) and physical assets for radio access.

Virtualization

Virtualization is key as it enables effective resource sharing among slices. To make these resources suitable for network slicing, the aforementioned resources and their attributes need to be abstracted and logically partitioned with virtualization mechanisms.

Resource abstraction is the representation of a resource in terms of attributes that match predefined selection criteria while hiding or ignoring aspects that are irrelevant to such criteria, in an attempt to simplify management. The resources to be virtualized can be physical or already virtualized, supporting a recursive pattern with different abstraction layers.

Just like in the case of VMs, network virtualization enables the creation of multiple isolated virtual networks that are completely decoupled from the underlying physical network, and can safely run on top of it.

The introduction of virtualization to the networking field has spawned new business models, new players with distinct business roles. Consider:

Infrastructure Provider (InP): who owns and manages a given physical network and its constituent resources. Resources, such as WANs and/or data center (DCs), are virtualized and then offered to single or multiple tenants.

Tenant: then leases virtual resources from one or more InPs. Usually in the form of a virtual network, with which the tenant can realize, manage and provide services to its end-users.

End-user: consumes (part of) the services supplied by the tenant for his own needs.

Stay tuned for Part 2: Network Slicing, concepts and requirements Originally published by ECI:<https://blog.ecitele.com>



Supporting Women in STEM

Janice Sutherland
CEO, Sutherland Coaching and Consulting

In the last edition I shared my learnings from the incredible women who have developed substantial careers in STEM industries (science, technology, engineering, and mathematics). Their roles ran the scale, from management to policy, to marketing to HR, technology and finance. The sheer range of careers represented indicated that working in the STEM arena covers a multitude of skillsets that women could certainly succeed in. So what is best practice for employers who want to attract more women into STEM industries?

Establish a Culture of Mentorship

The value of mentorship figured highly with emphasis on not only finding a mentor but most importantly, utilizing a mentor as a very powerful way to aid female development and contrary to popular thought, it is just as important for men to mentor women as well as the obvious women to mentor women in order to build on knowledge and skills across the board.

- For the mentee: it's a great way to share life experiences and learn from a mentor's challenges and achievements. It is also important for women to own their careers. By utilizing mentorship, sponsorship and coaching, weaknesses can be turned into strengths. Women owning their careers is a critical success factor. That is, in order for mentorship to be effective, it is important for women to realize their ambitions, weaknesses, and strengths. Learn how to promote themselves in the work environment and understand their skill gaps and learn how to correct them. Mentorship offers the possibility of exposure to different experiences to aid personal growth. For women concerned that they wouldn't be able to source their ideal mentor, then the creation of a composite mentor—where you take 3-4 persons with different qualities to provide the required support was cited.

- For the mentor: it's an opportunity to expand professional networks and make a difference to the career development of another person.
- For organizations: There is an up-side for organizations as a mentorship program indicates that an employer has a culture of continuous learning and knowledge transfer as well as a diverse workforce that stimulates, innovates and cultivates creativity. Additionally, it sends a signal that the well-being and success of your employees is important and valued and that you are willing to go the extra mile in helping them achieve their personal and professional development. It aids employee retention in turn improving your workforce planning and succession planning strategy further guaranteeing that your valuable organizational knowledge is not lost. Reverse mentoring can ensure senior executives stay current with new business practices and technology.

Mitigate Unconscious Bias

Being the only woman in the room can also bring challenges, even more so when the bias is so ingrained that it happens unconsciously. Unconscious bias refers to the attitudes, preferences, approaches or stereotypes that affect our understanding, decisions and actions in an unconscious manner. These biases — involuntarily and activated without intentional awareness — can include both favorable and unfavorable evaluations. Unconscious preferences influence the way we engage with others. It can be displayed in recruitment practices such as;

- Gender bias – the assumption that women can't be engineers because they're women totally ignoring qualifications, achievements or experience
- Likeness bias - hiring only those people that are like them and again would be more prevalent if a man were recruiting for what would be considered a male role

- Confirmation bias – unconsciously looking for information or evidence to back up a prior-held belief or a judgement made about someone e.g. women are poor at math and therefore cannot be good scientists. This is because there is an inherent wish to believe that we're right.

Anecdotally we hear of the experiences of females in male dominated environs; difficulty in securing work without golfing, sailing, hockey experience, being the only woman in a board room, not being expected to return to work after maternity leave.

Whilst there are many more examples of unconscious bias (research indicates over 150 types), the first step as an employer is to be actively conscious of its existence and how it can impact others in order to reduce.

For organizations, there are obvious places to check that unconscious bias isn't being displayed such as:

- Being proactively cognizant of what it is and how it can affect employees. This awareness begins to move the unconscious into the conscious where organizations can be completely aware and begin to manage the bias and its effects. Individuals within companies have subconscious preferences for certain people and objects, which unintentionally influence decision making.
- To reduce the effects of unconscious bias, encourage your people managers (and yourself) to question personal biases and raise awareness in others by asking the following questions:
 - Is my opinion factually true?
 - Is it always factually true?
 - What evidence do I have?
- Encourage inclusive meeting practices,
 - Meeting organizers should solicit feedback from all participants not just those who are more vocal or visible. Remembering not to always draw upon the same people's opinions consistently but equally not discount opinions on this basis.

- Limit interruptions, including the checking of emails or phone usage, allowing all persons to be heard.
- Support constructive rather than negative responses that may stop persons from voicing their opinion again
- Ensure final decisions are balanced and not influenced by the power a single individual may hold
- Openness to challenges from all parties by asking for counter opinions and examples.
- Create a supportive dialogue, proactively encourage others to speak up
- Create a culture of supportive dialogue – everyone has unconscious biases and can display micro-behaviors as a result. It can still be difficult to have and manage conversations without the giving or receiving of these micro-behaviors. Coach employees in the use of supportive phrases when they are approaching subjects and ensure a constructive outcome such as:
 - Acknowledge (feelings) - "I understand you have a belief that a single mother will not be right for this role"
 - Clarify (avoid assumptions) - "Am I missing something as I am still unclear as to how this has come about?"
 - Explore (evidence) - "When you say, you feel clients would be unhappy, help me understand what you mean by that?"
 - Solve (moving forward) - "What would a better situation look like for you?"

By consciously practicing the above, persons can take the first steps towards supporting others to question bias and encourage women's voices to be heard.

Ultimately, STEM presents a wide range of opportunities for women and by encouraging women into the industries, it widens the recruitment pool for organizations seeking the best employees. With some adaptation of company cultures and systems, it's a win-win situation for all stakeholders.

CANTO Highlights



T. Wankin & L. Dieffenthaler at site visit in Miami for 2020 Conference



ECLAC staff paid courtesy visit to the Secretariat



Director, D. Clifford presents at Commonwealth ICT Forum



T. Wankin met with M. Cuffie and M. McDonald at iGovTT Symposium



J. Wilkins presents token to Senator the Hon. Robert Le Hunte



CTO ICT Forum '18 Trinidad



Secretary General & Chairman visit with Minister of Public Utilities



T. Wankin & J. Wilkins visit V. Maharaj at Legal Affairs Ministry

CANTO Highlights



35th AGM Launch (Guyana) - A. Griffith, T. Wankin & J. Nedd



Cross section of delegates at launch of 35th AGM in Guyana



T. Wankin met with D. Briton - PUC Chairman, Guyana



PUC Commissioners courtesy visit - Guyana



140th Board of Directors Meeting - Miami



Tripwireless™ Inc. (Colorado) & CANTO visit Tunapuna Regional Corporation to distribute backpacks to the affected flood victims



Children at Clarke Road Hindu School Penal receive their backpacks



Selected to Participate in YLAI 2018



Jayme Hoyte

Young entrepreneur Jayme Hoyte was selected as part of YLAI's 2018 cohort in the United States to learn best practices and techniques to advance her organization. After returning home from the 5-week fellowship, a golden opportunity of now supplying their Education Management Platform to new markets in Ecuador emerged.

We are pleased to share with you the recent accomplishments of one of our past employees Jayme Hoyte. Jayme and the team at SmartTerm are making a tremendous impact in Education for the Caribbean Region.

Jayme is the Co-Founder and Executive Director of SmartTerm Limited, an Education Management Platform that is redefining the way we educate in developing countries. She was among the five entrepreneurs selected as part of the 2018 Young Leaders of the Americas Initiative (YLAI) Professional Fellows Program.

Out of nearly 2,500 applications, 250 young leaders from 36 countries in Latin America and the Caribbean were selected to participate in a five-week Fellows Program, sponsored by the Bureau of Educational and Cultural Affairs of the U.S. Department of State. The program placed business and social entrepreneurs in small businesses, non-governmental organizations, and similar entities in 20 U.S. cities for hands-on training to develop their business or social venture plans, learn from their U.S. counterparts, and share best practices.

The YLAI Professional Fellows Program began on September 20th in Detroit, Michigan and participants were then engaged in a four-week fellowship in cities throughout the U.S. The program came to a close with a closing Summit in Washington, DC.

Jayme was placed in Kansas City and when asked about her experience she responded with the following; "It's amazing to see how much growth and development has taken place in just five weeks. I worked with an extraordinary woman by the name of Rebecca Dove who is the CEO of Pennez, a company that teaches students to read using Artificial Intelligence. I was able to learn and acquire skills in Machine Learning and Artificial Intelligence, different strategies in Marketing an Education Management Platform and I was able to develop a strong investor pitch".

At the closing, forum participants were engaged in a number of workshops and a pitch exhibit. "Out of 250 participants, 30 participants were selected to pitch and exhibit SmartTerm", Jayme Hoyte was one of the 30.

Entrepreneurs are drivers of economies and the YLAI platform has provided many entrepreneurs of the Caribbean and Latin America with opportunities to collaborate with each other thereby fostering economic growth and development for the region. As a result of YLAI new markets have opened-up for SmartTerm. SmartTerm will be partnering with Michaelangelo Falconi, CEO of ARCIS, to provide schools in Ecuador with our Education



J. Hoyte Centre Flanked by Other Global YCAI Entrepreneurs

Management Platform and other EdTech services to take schools from a manual way of operating and elevate them to a digital platform providing powerful analytics and insight into the learning experience.

Jayne has volunteered with the Ministry of Planning and Sustainable Development and CANTO. She has a Master's degree in Global Studies with a specialization in Economics and Foreign Aid and a Bachelor's degree in Economics and International Relations. She currently serves as an Executive with PIEDATA and has the ability to consult on Technologies for Education and Innovation.

SmartTerm

Our School and Learning Management Platform is robust and focuses on data first. We believe that in order to help develop the economies of developing countries we have to invest in education and youth. To do that we have to make data-driven decisions that will result in leaders and institutions implementing the right solutions. By using machine learning and artificial intelligence we intend on making useful suggestions to impact how we learn. SmartTerm believes in developing, sustaining, and innovation in developing countries, ultimately increasing the quality of life.



With Critical Infrastructure Security, Don't Let Your Guard Down

Marco Berger
Head of Utilities and Critical Infrastructures Vertical Solutions at ECI.

Cybersecurity of critical energy infrastructure is a growing concern as the industry experiences a significant overhaul with grids, power, water and gas becoming increasingly smart and automated. For utility companies, the consequences of inadequate cyber security include service and grid outages affecting thousands of customers, if not more. The “fourth industrial revolution,” demands major changes in the utilities sector’s technology deployments.

As awareness of this trend grows, federal governments insist that measures be enacted not just for companies that own and operate public utilities, but also for local and federal regulators tasked with ensuring the safety and reliability of critical services. Continued attacks to Ukraine’s infrastructure over a number of years demonstrated to a global audience how attackers were able gain access to ICS networks with multiple tactics, from malware to phishing. Now in 2018, the list of countries who have fallen victim to similar incidents has grown. Because of these factors, many federal and regional agencies have updated cybersecurity standards for power and electric utilities, a proactive effort to combat cyber crime.

Vulnerabilities everywhere:

Transformative Initiatives - Decentralization (distribution and generation), automation and digitization enable unprecedented system-wide visibility and control for utilities operators, but open a myriad of entry points for hackers to exploit.

Mobility - Vehicle to infrastructure communications require vehicles to communicate with the power grid, widely expanding the attack surface.

Distribution - The shift toward incorporating more distributed energy resources in the last decade and embracing an energy cloud fed by varied generators such as wind, solar, tidal, nuclear, coal and gas creates many points of entry, expanding vulnerabilities within the grid.

Smart Metering - Power distributors are moving to this more efficient pay-as-you-use model, which can be installed in almost any location that uses power - home, business or other. These vulnerable entry points exponentially increase attack surfaces.

The challenges related to systemic transition – disruptive technologies creating multiple new entry points - showcase the difficulty utility companies face to thoroughly secure themselves. As a result, the industry is forecasted to increase its spending from \$1.8 billion in 2017 to nearly \$3.2 billion by 2026 to protect energy systems against cyber-attacks.

Whatever you do, don’t stop modernization - IT and OT infrastructure Integrating IT and OT, two previously segregated systems, may increase cybersecurity risk, but the continued modernization of these technologies facilitates better cyber security posture. As technology and market factors make it unrealistic to keep IT and OT separated moving forward, the most vulnerable entry points remain the endpoints - router ports, workstations, IADs - because they are often overlooked and unsecured. Threats aimed at utilities are typically characterized by attacks coming from the IT toward the OT, from the OT to the IT and sometimes in the middle communications layer.

Threats coming from the IT towards the OT

An instance that took the path from IT to OT occurred this year in Ukraine, where attackers succeeded in taking control of workers’ workstations via their credentials and access allowances to freeze control panels, disrupt SCADA and control stations, block customers calls toward emergency center and more.

Man-in-the Middle attacks

Breaches and operation disruptions can be caused via physical “tapping” on the communications optical, wireless and copper infrastructure. This method was used by attackers to infiltrate consumer credit agency Equifax, on several occasions, causing a leak of at least 15 million

customers' credit and personal data, and a data leak of several third-party mobile apps used by the company for its customer services. These types of attacks can be prevented by implementing sophisticated encryption to secure communications traffic from *Layer 1* up to *Layer 7*.

Threats coming from inside the OT

A notable attack that fits this path affected the transportation arm of a major metropolitan city. In this case, the agency's ticket kiosks along the operational stations were targeted, disrupting billing operations for more than 24 hours and introducing malware intended to disrupt the actual control and traffic of the entire system. Such attacks are also called *Zero-Day-Attacks* because they are typically performed by malware or worms never before tracked or identified. The best response to this type of attack is to utilize SCADA DPI or Anomaly Detection tools.

The solution is secure, but not simple

As utilities discover they have already been targeted or attacked, they are racing to implement regulatory recommendations strategically developed based on past threats and attacks. Nevertheless, these security precautions, however necessary, involve expensive and sophisticated tools, services and policies, demanding long-term budget planning and allocation.

A healthy cybersecurity approach isn't limited to one or a few parts of the company, such as IT departments, and adherence to self-decided standards, rules and practices must be both a top-down and a bottom-up responsibility flow. Your security solution must be complementary to all current security approaches and will ultimately fail without company-wide awareness and implementation of practices and procedures.

To protect OT, you should use your communications layer - the highway all services and applications run along - to more easily secure networks and systems. Since this layer connects the utility company network to the outside world, it's the most vulnerable to, and most often used for, attacks by cyber criminals. At the same time, it's a part of the network that cyber security solutions providers often overlook.

A reliable solution, therefore, must protect on a constant basis from threat actors attempting to carry out a variety of attacks, such as those originating from IT and aimed

at the OT; originating in the OT and targeting networks affecting SCADA; or attacks where the hacker infiltrates the fiber network.

Unique Utilities Need Unique Solutions

Utilities have a steep learning curve when it comes to cybersecurity and have learned some crucial lessons in recent years. One of the most important findings is that cyber-attacks are increasingly executed not by individuals or small groups, but by governments and large entities or "state actors," who deploy massive resources and skills to be successful, with critical infrastructure as a major target.

They are also learning that cyber-attacks are not exclusive to the new IP, TCP/IP-based infrastructure, but have also happened in the "considered-secure" legacy infrastructure as well, including TDM, SDH, SONET and old SCADA and PLC systems. A short "trip", or search, on the "dark-web" will reveal hacker tools available for use against all types of devices, legacy and next generation.

As a result of recent regulations, most utilities now perform routine threat analysis scenarios and consultations, and as well as intensive staff training on data and cybersecurity practices, using the recommendations as a framework. Based the outcomes of the threat analyses, new cybersecurity elements are introduced both in the IT and on the OT networks and systems, such as: *SCADA aware Firewall*, *Access Control* systems, *Smart CCTV* systems, *Detection and Prevention* tools and systems, new policies and encryption on sensitive data and connectivity.

For many in the utilities sector, they may have never imagined that cyber security would be one of the major concerns and important investments of the 21st century. But as the industry evolves key aspects of its technological foundation, and vulnerabilities thereby multiply, a whole new world of cyber crime opens to the world of critical energy infrastructure. It's essential to the ongoing success of utility companies that they invest in a comprehensive cybersecurity approach that considers both protecting the communication layer and complementary physical security measures.

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Transitioning To A Digital Region
Opportunities & Challenges

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CALLING ALL STUDENTS AGES 13 – 21
CREATE A SHORT VIDEO
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ON THE THEME:

'MY VISION OF A DIGITALLY CONNECTED SOCIETY'

- Creatively demonstrate your vision of a digitally connected society by addressing possible impacts in areas such as **education, healthcare, energy, entertainment, transportation, legal and regulatory framework etc.**

- Entries must be submitted on or before **May 2nd, 2019**



- Trip to attend CANTO 2019 in Trinidad
- Hotel Accommodation
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- Tablet plus US\$500



- Tablet plus US\$250



- Tablet

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TV Peru Expands Distribution of its HD Content

Stan Schneider
Schneider Communications Corp.

Luxembourg, 13 November 2018 -- Intelsat S.A. (NYSE: I), operator of the world's first Globalized Network and leader in integrated satellite communications, today announced that the National Institute of Radio and Television of Peru (TV Peru), a leading Peruvian TV broadcaster, has signed a new and expanded contract to enhance its Digital Terrestrial Television (DTT) offering in Peru and to strongly position the company to distribute its programming internationally.

Under the multi-year agreement, TV Peru renewed C- and Ku-band services on Intelsat 14, the company's latest video neighborhood in Latin America, located at 315°E. TV Peru will rely on Intelsat 14 to distribute high-definition (HD) and standard-definition (SD) content to its television stations and affiliates in Peru as well as to provide contribution services for sports and news-gathering.

In addition, TV Peru will utilize C-band satellite solutions on Intelsat 11 to launch a new, international HD channel in Peru. By choosing to expand to Intelsat's highly penetrated Intelsat 11 neighborhood located at 317°E, TV Peru joins a select group of top tier programmers. Intelsat 11 distributes more than 200 channels, with over 95 channels in HD. The reach of Intelsat 11 will enable TV Peru to cost effectively expand its content distribution to other parts of South America, North America and Europe. Intelsat's unique capabilities in managed services will allow TV Peru to downlink its content from Intelsat 14 and then uplink this content to Intelsat 11 for distribution to cable head-ends, via the company's teleport in Ellenwood, in the United States.

"TV Peru needed a reliable and comprehensive broadcast solution to launch our international high-definition programming," said Hugo Coya, CEO of the National Institute of Radio and Television of Peru. "Intelsat is a trusted, long-time partner and the obvious choice for distributing our TV Peru International channel to new viewers throughout the Americas and Europe. Intelsat's unique dual satellite solution and managed service will enable us to quickly and cost effectively grow our audience."

"The unprecedented reach of our Latin America video neighborhoods enables media companies such as TV Peru to economically grow their business," said Rob Cerbone, vice president and general manager of media at Intelsat. "The flexibility, reliability and efficiency of our global network infrastructure will allow TV Peru to confidently launch a new international channel, broaden their reach and delight viewers across three continents with premium, high quality and entertaining content."

Supporting Resources:

- [Intelsat Media Services](#)
- [Intelsat's Latin America Video Neighborhoods](#)
- [Intelsat DTT Services](#)

About Intelsat

Intelsat S.A. (NYSE: I) operates the world's first Globalized Network, delivering high-quality, cost-effective video and broadband services anywhere in the world. Intelsat's Globalized Network combines the world's largest satellite backbone with terrestrial infrastructure, managed services and an open, interoperable architecture to enable customers to drive revenue and reach through a new generation of network services. Thousands of organizations serving billions of people worldwide rely on Intelsat to provide ubiquitous broadband connectivity, multi-format video broadcasting, secure satellite communications and seamless mobility services. The end result is an entirely new world, one that allows us to envision the impossible, connect without boundaries and transform the ways in which we live. For more information, visit www.intelsat.com.

About the National Institute of Radio and Television of Peru

The National Institute of Radio and Television of Peru, also known as TV Perú, is the largest broadcast television network service in Peru with 300 TV stations. In Lima, the network's VHF is channel 7. The station was founded

on 17 January 1958 with the aid of UNESCO in a joint investment with the Peruvian Government, under the name Radio y Televisión Peruana (RTP). In March 2010, TV Perú launched its high-definition signal (using ISDB-TB) with the government of Japan who provided the equipment for the high-definition signal. On December 2017, TV Perú launched its TV Perú Internacional channel via satellite initially for distribution in the United States. Since then, it has expanded to Spain and Italy, as well as neighboring countries where there is a Peruvian diaspora, such as Chile and Argentina. TV Perú's headquarters are in Lima, Peru.

Intelsat Safe Harbor Statement:

Statements in this news release constitute "forward-looking statements" that do not directly or exclusively relate to historical facts. When used in this release, the words "may," "will," "might," "should," "expect," "plan," "anticipate," "project," "believe," "estimate," "predict," "intend," "potential," "outlook," and "continue," and the negative of these terms, and other similar expressions are intended to identify forward-looking statements and information.

The forward-looking statements reflect Intelsat's intentions, plans, expectations, anticipations, projections, estimations, predictions, outlook, assumptions and beliefs about future events and are subject to risks, uncertainties and other factors, many of which are outside of Intelsat's control. Important factors that could cause actual results to differ materially from the expectations expressed or implied in the forward-looking statements include known and unknown risks. Known risks include, among others, the risks described in Intelsat's annual report on Form 20-F for the year ended December 31, 2017, its quarterly report on Form 6-K for the quarter ended June 30, 2018 and its other filings with the U.S. Securities and Exchange Commission.

Because actual results could differ materially from Intelsat's intentions, plans, expectations, anticipations, projections, estimations, predictions, outlook, assumptions and beliefs about the future, you are urged to view all forward-looking statements with caution. Intelsat does not undertake any obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.



How to Create Caribbean Smart Cities

Anil Sadhoeram founder and Chief Philosophy Officer at Nxt Wave Inc.

Nxt Wave Inc. is an independent strategy & technology advisory firm aimed at helping clients with relevant insights and intelligence. Nxt Wave Inc. has global alliances with cool vendors, leading technology service providers and top notch analysts firms.

Technology changed everything in our world. Things that once thought to be science fiction are now reality. Life with a smartphone is pretty easy: you can email, chat, make video-calls, use Facebook and You tube, buy online at Amazon or Alibaba, play virtual reality games and check your movies and series via Netflix. All of it on your own little screens.

With the rise of Artificial Intelligence computers are getting much smarter everyday. We already have autonomous driving cars and buses, drones for logistics and agriculture. Robots and bots are entering the workforce and humans are spending more time online and are also consuming more online. We actually live in a time where Data is becoming the most valuable asset.

A Samsung's executive compares the Oil Economy with the Data Economy. In his chart showed recently at the Web Summit in Lisbon you can see the shift of industry power over a period of ten years.



The Internet is now the Internet of things, new technological developments such as the blockchain, cryptocurrencies and cybersecurity are redefining the rules of knowledge, business and power. The world around us is changing rapidly.

If something is changing faster and faster it means it's not speeding but it is accelerating: this means Technology is not just a tool but an Artificially Generated Force!

If you look at the origins of human inventions and discoveries you see how convergence of multiple scientific endeavours bring together a different paradigm of human life.

Ten years ago, "Tech Titans" such as IBM, Cisco and Siemens started to shift their go-to-market strategies. With the financial crisis happening, big corporations stopped spending on IT so the Tech Titans started to market their "enterprise solutions"; basically the same or similar hardware and software, to governments all over the world.

Today world famous cities such as Amsterdam, New York, Singapore and Dubai to name a few are transforming into Smart Cities.

The benefits of a Smart City are cost efficiencies, transparency, safety and speed of operations. The biggest benefit, in theory, is that you get **predictive capabilities** with the next generation technology in your governments hands.

So instead of guessing what the public wants, you get data-driven-decision-making at reach. Your country can connect internationally and much easier with other Smart Cities through Smart Airports and Harbours.

Smart Cities need Smart Citizens need Smart Commerce need Smart Governance. It will not happen overnight but if done well, chances are it will stimulate international trade and significantly improve the quality of life and safety in the city for both current and next generations of inhabitants.

A Smart City that is designed with the right vision and that is integrated into the local context and culture will bring plenty of opportunities for everyone.

Technology does not only bring Hosanna...

At the opening ceremony of the Web Summit 2018 in Lisbon, a huge gathering of 70,000 people from all over the world, the inventor of the World Wide Web Tim Berners-Lee talked about the days when he was working as a consulting physicist at CERN and came up with the idea of the Web over 30 years ago.

He wrote a memo in 1989, 20 years after Vincent Cerf and co invented the internet, and convinced his boss to endorse the idea in the memo. Apparently his boss was not completely convinced but was somehow charmed by the idea that the project would involve the NeXT, a computer that Steve Jobs had created after he was fired from his own Apple. So Tim's boss allowed him to go ahead, but to treat it as a side project and said 'yes' to purchase the NeXT computer.

They used this as the first server so that was the beginning of the World Wide Web and the fundamental idea was that if humans and technology would interact with each other, the world would become a better place.

But today as time has passed, Tim Berners-Lee himself sets the tone in his opening keynote and basically says that the original idea of a free World Wide Web is broken.

While one half of the world still does not have access to the Internet, the other half, although having all the advantages of the Internet, is at high risk of losing privacy, democracy and even mental health.

"The web is at a crucial point," Tim Berners-Lee said. "More than half the world's population remains offline, and the rate of new people getting connected is slowing.

Those of us who are online are seeing our rights and freedoms threatened." See the graphs used at the summit.

He urged governments, private companies and Internet users to sign up a contract for the Web, basically to protect the rights and freedom of Internet users. There are nine principles in the contract. This "Contract for the Web" asks governments to ensure that all citizens can connect to the Internet, that companies respect consumers' privacy and personal data and that citizens create "rich and relevant content for everyone."

Around 50 companies including Facebook and Google have already signed the contract. The government of France has also signed the contract because they say they believe in an Internet that serves the people and not vice versa.

Tim Berners-Lee hopes that his campaign will generate enough support to publish the contract by May 2019, the projected year when more than half the world's population will have access to the Web.

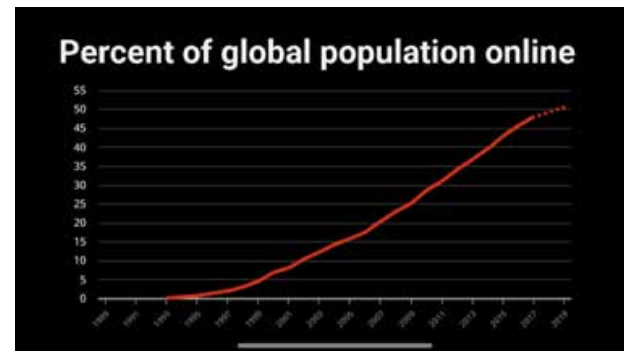


Fig. 2

Future of Politics

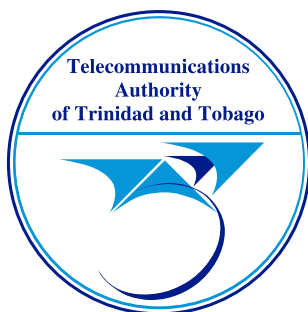
In the United Kingdom a company called Cambridge Analytica played an obscure role in the Brexit referendum. And it seems like this company also used Data from millions of Facebook-users in the USA to manipulate the outcome of the elections leveraging the social engineering capabilities of the platform, as it turned, in favor of President Donald Trump.

Don't be fooled into thinking that this is an isolated case or a unique American phenomena, and that it won't happen in the Caribbean. It is part of a global trend.

In some Caribbean Countries such as Suriname there are relatively many Facebook users, this fact might be of influence on the next elections in 2020. Existing and new political parties or movements can create a "groundswell of support" and change the political landscape in our Caribbean region.

"Start with the End in Mind" said Stephen Covey. The way I see it is that smart cities start with smart citizens. It's important to start the conversation and ask the relevant questions about the future of our societies.

Join me at the CANTO AGM in Guyana to continue this conversation.



Finding New Media Models for Survival and Success

TATT

Traditional media houses in the future will become more heavily dependent on their readers paying for their news directly, while content distributors like Facebook and Google will become the primary beneficiaries of advertising dollars in the digital space.

So said Mr. David Ho, a United States - based independent media consultant, while sharing insights and experiences about transformations in the media landscape as a consequence of the growing preference for digital media.

David Ho presented on “Traditional Media & Digital Media - Are There Business Models for Survival?” at the 2nd Annual Broadcasters’ Forum, hosted by the Telecommunications Authority of Trinidad and Tobago (TATT) in conjunction with the Trinidad and Tobago Publishers and Broadcasters Association (TTPBA).

According to Mr. Ho, “Facebook and Google are not your (*traditional Broadcasters*) friends.” He stressed that this issue of developing new models for success in the digital era had implications for both the traditional print and electronic media which depend heavily on advertising revenue for their survival.

Mr. Ho drove home the point that if consumers continue to gravitate towards the Internet as their main news source, advertisers would very likely move more of their business to that platform.

Broadcasters in Trinidad and Tobago as well as in the rest of the Caribbean are also quickly coming to terms with the reality of the smartphone being the primary source of access for news and current affairs. Consequently, the smartphone is quickly rendering traditional communications tools archaic.

While data on the Caribbean scenario may not be readily available, a 2017 Pew Research Center survey provided some United States statistics. These statistics showed mobile devices becoming one of the most common ways Americans

get news, outpacing the desktop or laptop computers. The survey revealed that 58% of U.S. adults often get news on a mobile device, whilst 39% often get news on a desktop or laptop computer.

Smartphone owners can get news via social media, traditional websites and mobile apps and what these consumers do with the content they access is also changing. Sharing articles, commenting on news items and features, and conducting research in real time, either to verify or refute the content, is now commonplace.

Additionally, the smartphone allows the content generator to send alerts and information directly to the consumer’s phone on a regular basis or immediate alerts on breaking global news.

Changing lifestyles and the ways that people consume and interact with news and information have changed radically, and media houses must creatively navigate through this new reality an advertising revenue perspective if they are to survive.

Another speaker at the Forum, David Oxenford, a United States Attorney at Law, said it is worth noting, that both opportunities as well as responsibilities are created for traditional media outlets entering cyberspace.

David Oxenford’s regulatory expertise comprises all areas of broadcast law, including the technical rules of the Federal Communications Commission (FCC), media ownership limitations, political broadcasting rules and equal opportunity policy.

Oxenford noted that rights to broadcast programmes on television do not necessarily translate to rights to broadcast these programmes online. Since our local television broadcasters depend heavily on foreign-based media content, this information was useful to prevent unwanted litigation.

Mr. Oxenford stressed the general point that just because something is on the Internet does not mean that any entity has a right to use it on its website. It must be assumed that pictures, videos and articles found online are copyrighted and permission must, therefore, be sought to reproduce them.

Oxenford continued “This should shut the door on the misconception that the Internet is a free ‘open house’ of content from which anyone is at liberty to download anything and upload to any Internet platform”.

He gave the example of a landmark copyright case in New York in 2013 where two media companies, *Agence France-Presse* and *Getty Images*, were ordered to pay US \$1.2 million to freelance photojournalist Daniel Morel for their unauthorised use of his photographs posted to Twitter. The jury found that the companies willfully violated the Copyright Act when they used photos Mr. Morel took in his native Haiti after the 2010 earthquake.

Another example case cited by Oxenford occurred in 2017 when CBS Broadcasting Inc. sued photographer Jon Tannen for posting still images from the *Gunsmoke* television show episode, “Dooley Surrenders,” first aired in 1958. In the complaint, CBS accused him of copyright infringement when he posted the image on social media.

All popular social media platforms have rules and regulations pertaining to what can be published. For broadcasters, these rules and regulations, which are agreed upon when they sign up for the service, should be carefully scrutinised, as violation could result in cancelled or limited access accounts.

One example is that YouTube informs its subscribers that there can be no sale of advertising, sponsorships or promotions placed on or within the service or content “without YouTube’s consent”. However, YouTube allows creation of content channels where they share the income.

Facebook states that pages promoting firearms, alcohol, tobacco or adult products must be limited to persons 18 years or older. There must be no promotion of gambling

without Facebook’s approval and no promotion of prescription drugs. These restrictions will be pertinent for a media house intending to engage in affiliate marketing.

Furthermore, social media platforms’ rules and regulations can also affect a media outlet’s intellectual property rights to its content such as photographs and videos.

For example, Facebook’s Terms of Service states, inter alia: *“Specifically, when you share, post, or upload content that is covered by intellectual property rights (like photos or videos) on or in connection with our products, you grant us a non-exclusive, transferable, sub-licensable, royalty-free, and worldwide license to host, use, distribute, modify, run, copy, publicly perform or display, translate, and create derivative works of your content (consistent with your privacy and application settings).”*

Instagram’s Terms of Use states, inter alia: *“when you share, post, or upload content that is covered by intellectual property rights (like photos or videos) on or in connection with our service, you hereby grant to us a non-exclusive, royalty-free, transferable, sub-licensable, worldwide license to host, use, distribute, modify, run, copy, publicly perform or display, translate, and create derivative works of your content (consistent with your privacy and application settings).”*

Given these stipulations, media outlets must be prepared to relinquish some control of content when posting on these social media platforms and will have to determine whether the potential increase in exposure, and possibly revenue, will be worth this seeming loosening of their grip on their own intellectual property rights.

Whilst adapting to the changing media ecosystem and embracing new media models to adapt; traditional media houses will need to find a balance between their rights and their need for continued advertising revenue streams if they are to survive.



Intelligent Order Orchestration

Scott Argue,
VP Client Services at SaskTel International

Service providers face the challenge of trying to meet customer demands and the continual task of having to modernize their communication network technologies. These challenges are often magnified when service providers look to densify their networks by deploying fibre to enhance or replace traditional coax and copper technologies. Having a mix of network technologies can add complexity to an already demanding environment.

As a result, service providers are looking to consolidate the network technology they've acquired into a single assignment, provisioning, activation, and inventory management solution. If service orders and network assets are not centrally managed, a provider could run into issues with inventory reconciliation, errors in customer billing and a lack of control over network costs. This can lead to a poorly optimized network which makes it difficult to achieve the desired return on investment. Accurate inventory and tracking of network resources enables quicker service launches, informed decisions, better forecasting, and quicker trouble resolution.

There are many benefits of consolidating communication network technologies into a single, central solution. Examples include: (1) alignment of processes and standards (2) decrease in operating complexity by reducing integration and hand off points and (3) consistent training and skills required throughout the organization.

Alignment of Processes and Standards

Eliminate "information silos" that could be present if there are multiple inventory management systems in play. This naturally creates a better environment for knowledge sharing and a consistent view of data, business rules, processes and workflow across the organization.

Decrease in Operating Complexity

A single solution simplifies integration and product maintenance while minimizing incompatibility between systems. A comprehensive and consistent picture of all network elements will deliver higher value through more effective use of the network.

Consistent Skills & Training

A central solution will increase the capacity and efficiency of your workforce through substantially reduced learning curves. Employees will have a familiar and standard user interface with a consistent implementation of business rules and processes. Quicker and easier training will ensure resource continuity and reduce impacts of staff turnover.

Being able to manage and optimize all communication network technologies in one system allows service providers to have better control, insight, and flexibility when it comes to delivering services to customers in real time. Effectively utilizing new communication network technologies will play a large part in a service provider's ability to maintain profitability, offset customer churn and optimize operational activities going forward.

Through automation, service providers can determine the best path and network components to provision services to a customer. Having insight into subscribed services for a customer as well as services available based on network capabilities and location, supports a positive customer experience and potential up-sell opportunities. This will ensure accuracy and instill confidence that the service delivered will meet expectations additionally, a consolidated solution will ensure that facilities are available, valid, non-defective, and not associated with future pending services. This granular view of services and network along with its capabilities will contribute to cost effective usage of the network, fewer truck rolls, and better understanding of what technology is available, making the management of their services and network easier and more efficient.

SaskTel International's goal is to make managing all aspects of your network easier by providing industry proven solutions that enable optimized flow-through provisioning of services. SaskTel International can help you operate more efficiently by automating business processes and giving you visibility into accurate network inventory. Doing so will allow you to decrease operating complexity, reduce costs and improve your customer experience. For more information e-mail: info@sasktelinternational.com or visit our website: www.sasktelinternational.com.



SaskTel International's (SI) goal is to make managing your network easier. Optius™ and its intelligent network and service order assignment, provisioning, activation and inventory management capabilities will help you take full advantage of your coax, fibre and copper network investments.

By automating business processes and giving you visibility into accurate network inventory, we can help you operate more efficiently, decrease operating complexity, reduce costs and improve your customer experience.

For over 30 years, SI has been working with service providers, delivering software and trusted advice to help them enhance their business. SI has expanded its current capabilities for fibre and copper and has extended them to support cable (coax) and hybrid fibre coax (HFC). Optius and its HFC capabilities will provide you with the control and visibility to make successful business decisions. For more information on how SI's solutions enable coax and hybrid fibre coax networks, visit our website: www.sasktelinternational.com/hybrid-fibre-coax.

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A Regulatory Reset for the Digital Economy

David Geary and Kieran Meskell,
Digicel

Introduction

Many governments and policy makers are grappling with the challenge of how to enable the transition to the digital economy. Much of the focus has been on the development of digital networks but while networks are a fundamental enabler they are only one side of the equation. The other side relates to the digital services which run over them. Both components are necessary before a country can fully participate in the globalised digital economy.

Put another way, why build high speed networks if there is not a matching broad adoption of digital services and a transformative shift across industries and society in general? For developing economies policy choices and regulations are key tools that ensure that they do not get left behind while developed economies accelerate away with increasingly dominant digital economy companies and high skilled jobs. Policies to ensure roll out of world class networks must therefore be matched by policies and action to reset wider legal and regulatory frameworks that enable the digital economy.

Reset of Existing Regulation of Services

As the provision of communications and other services becomes disaggregated from infrastructure and physical presence, a new approach to regulation must take account of the fact many of the new actors providing services in the economy do not have this physical presence. The embedded assumption that consumer, privacy, security and competition protections could be linked to licensing or registrations in a specific sector no longer hold true.

There is a consensus emerging that approaches to these issues are best dealt with by way of horizontal regulation rather than sector specific rules. Regulatory frameworks for the digital economy will require horizontal economy wide rules that apply to all service providers regardless of who provides services or where they are located. Important components include economy wide competition, consumer protection, data protection and content laws that take account of transnational global service providers. This approach also has the benefit of incentivising investment in networks as it

ensures that network operators can recoup their investment by introducing innovative services on a level playing field with on-line platforms and providers.

Regulation must also address new challenges associated with the digital era, for example in relation to the polarisation effect of social media, the use consumer data to target advertising, and manipulation of information to influence democratic systems. Examples of initiatives to address these challenges continue to emerge.

Steps in this direction are underway in the EU, but for regions that still work with first generation regulatory frameworks in the telecoms sector there is a real opportunity to innovate. The pace at which the digital economy is evolving requires a forward looking approach that leapfrogs the decades long iterations of existing regulatory frameworks. The costs and burden of telecoms regulation similar to the existing EU framework are likely to be excessive and counterproductive in many developing nations. An approach based on ex-post regulation and capping regulatory and USF costs is more likely to stimulate investment in networks.

In designing regulatory frameworks that will promote investment, how these apply to the users of infrastructure, must be considered as giving operators confidence that the regulatory regime will facilitate certain services assists the investment business case. This includes how any Net Neutrality rules will apply to future services. In this regard the US evidence based approach is very welcome. Key areas of uncertainty at present include the treatment of prioritised services, sponsored data and peering arrangements between network operators and digital economy players. As the digital economy develops more such questions will emerge and it will be important that outcomes are not predetermined by rules that cannot adapt.

A Wider Review of the Ecosystem

Other innovations will be required across the broader legal and regulatory framework to enable a digital economy. Policies and legislative changes that enable E-Government

and online public services are important. In addition to the economy wide rules outlined above innovations could include legislation on Digital Identity, legal enablers for e-payments and frameworks for the usage of cryptocurrencies.

In the field of civil law updates to laws on contract, defamation, intellectual property, product liability and civil liability laws may be required including liability in respect of autonomous systems and 3D printing. In the field of criminal law, cybersecurity and cybercrime provisions are necessary as are provisions that enable the police and security services to fulfil their mandates.

As Artificial Intelligence improves more and more industries will be disrupted. Services such as automated legal advice, medical consultations or accountancy services will soon be available on-line. Existing regulatory frameworks for these sectors are inadequate to address many of the issues raised. As so few countries have legal frameworks designed for this future this also creates an opportunity for countries to design frameworks that enable future services to emerge in their jurisdictions.

Taxation Models

Unless current taxation models are adapted Governments are facing decreasing taxation revenues as consumers move to services provided digitally from overseas providers who are outside of the tax net. Therefore taxation models must be adapted to ensure a fair contribution by all actors in the economy to fund government services.

A number of jurisdictions have taken steps to address this. These include straightforward updates to taxation codes to ensure VAT or sales taxes apply to e-Commerce transactions and the provision of services online. However, initiatives that go beyond the application of taxes on the consumption of services and which are aimed at requiring contributions from the providers of digital economy services regardless of their location are now at the centre of the debate particularly in the EU.

The funding of digital economy infrastructure should be considered in this context. For developing regions a model whereby the costs of infrastructure are borne directly and exclusively by consumers challenges the business case for the rollout of next generation networks. The Report of the UN Broadband Commission Expert Group noted the digital divide is widening. One important reason for this is because it is not commercially viable to roll out networks in many areas with the current funding model.

The debate on how digital economy players who benefit from the usage of networks should contribute, remains active. A possible response is the adaption of USF structures to reflect a “Pay or Play” model where recognition would be given for investments in network infrastructure. Such an approach might suit some digital economy players who are already looking at partnerships in this space. One example of a larger player engaging in connectivity solutions is the use of Google Loon for disaster recovery post hurricane in the Caribbean region. This could be considered as a ‘Play’ contribution under such a system. Obviously a key issue for regulators would be setting the criteria for assessing what are genuine and practical contributions

Conclusion

Legal and regulatory frameworks are key policy tools for shaping the digital ecosystem and it is imperative that these are modernised in tandem with the rollout of digital networks to ensure that societies are in a position to use the networks to enable a digital transformation.

The Internet has broken down traditional barriers between sectors and legal jurisdictions. Regulatory frameworks also need to move away from a sectoral silo approach and innovations across the broader legal and regulatory framework are required to enable a true digital economy to emerge.

The alignment of a cross sectoral approach will be one of the challenges for Governments embarking on this journey and in regions such as the Caribbean where small economies can achieve critical mass by working together the coordination and implementation of a regional approach will also be important.



C7 INITIATIVE Helps Kids in Need



Children from Clarke Road Hindu School, Penal are all happy with their new backpacks

Tripwireless™ Inc. (Colorado) and CANTO have partnered to launch the C7 Initiative, an assistance program whose mission is to provide school children in need with backpacks filled with an assortment of essential school supplies.

The origins of this initiative started with the aftermath of the devastating hurricanes that hit the Caribbean in September 2017, when Tripwireless™ spearheaded the idea and collaborated with CANTO and the Antigua Public Utilities Authority (APUA) to distribute 500 backpacks to children in more than 30 schools in Antigua and Barbuda.

Given the number of school children that are in need in the more impacted areas of this region, Tripwireless™ decided to turn this effort into an annual assistance program, called the C7 Initiative. Under this program, the goal is to provide 3000 backpacks to children in St. Maarten, Dominica, British Virgin Islands, Trinidad & Tobago, Antigua & Barbuda and Guyana.

The first 500 backpacks will be distributed to kids affected by the recent widespread flooding and landslides in Trinidad & Tobago. The backpacks are filled with folders, a notebook, crayons, markers, a ruler, erasers, pens, pencils and a pencil sharpeners. They are ready to go and planned for delivery in early December. For 2019, it is planned to provide 2500 school packs in regions with need.

Tripwireless™ has reached out to its wireless network partners to join in this worthy cause to help the kids in this region. We are pleased to have participation in the C7 Initiative from the Wesbell Group of Companies (Canada), the TelTech Group (Texas) and Geri Powell (Washington D.C.). As more partners come on board, we are confident that we will reach our goal of 3000 and hope to go beyond!

About TRIPWIRELESS™

Founded in 2005, Tripwireless™ is a telecommunications equipment supplier and strategic logistics company that offers cost-effective solutions for wireless network infrastructure and logistics projects. The company is based in Denver, Colorado and has an active presence in the Caribbean.



CALENDAR OF EVENTS

CANTO's 35th Annual General Meeting

27th- 29th
January
2019

GSMA Capacity Building Training
Unlocking Rural Mobile Coverage

30th
January
2019

CANTO 13th WTISD
Regional Video Competition

17th
May
2019

CANTO 35th Annual Conference
& Trade Exhibition
Hyatt Regency Hotel, Trinidad

21st -24th
July
2019



Transitioning To A Digital Region
Opportunities & Challenges

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Differente Nashon... Un Bos
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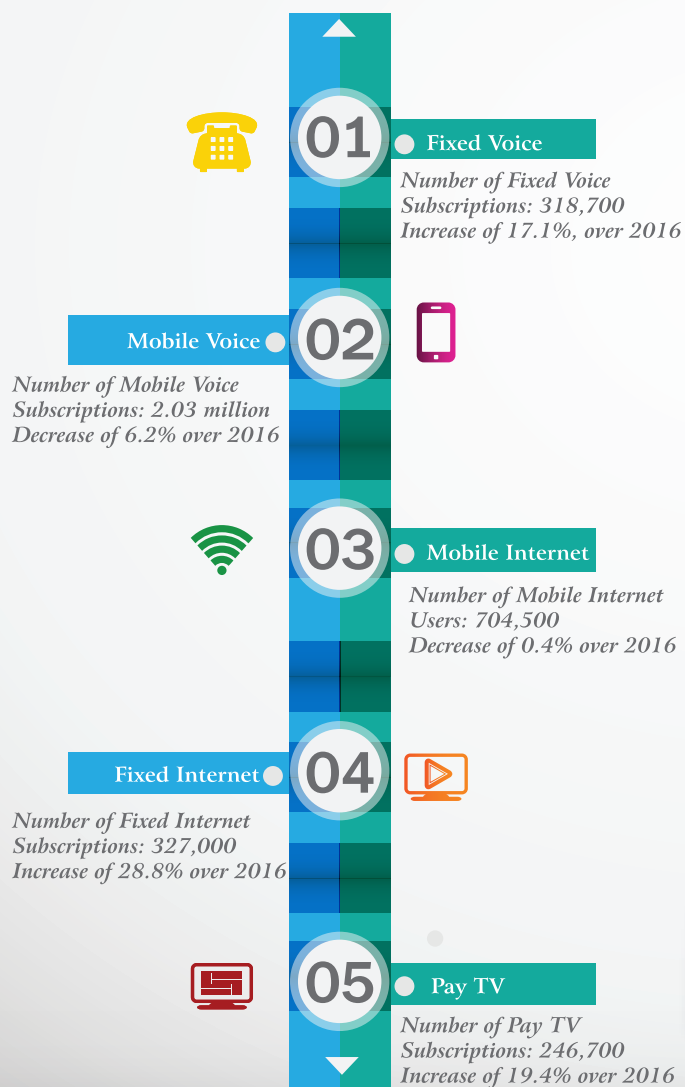




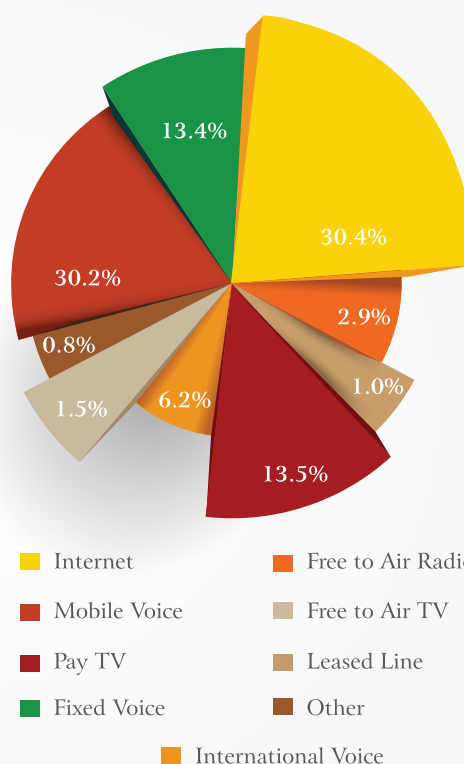
Telecommunications Authority
of Trinidad and Tobago
*Regulator of the
Telecommunications & Broadcasting Industries.*

**STATISTICS HIGHLIGHTING THE PERFORMANCE OF
TRINIDAD AND TOBAGO'S
TELECOMMUNICATIONS AND BROADCASTING INDUSTRIES**

► **Key Highlights of the Annual
Market Report 2017**



► **Percentage of Gross Revenues
Contributed by Markets - 2017**



In 2017, the Telecommunications and Broadcasting industries generated an estimated TT\$5.14 Billion in revenue which, as a percentage of GDP, equates to 3.4%

For more statistics on the performance of Trinidad and Tobago's telecommunications and broadcasting industries, please see the most recent quarterly and annual market reports at: www.tatt.org.tt



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