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## Broadband in South Africa

Universal access and business enablement

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## Broadband in South Africa

Universal access and business enablement

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# 01

## Introduction

The impact of Broadband on today's commercial and social environments is too immense to measure. There is no doubt that Internet access has changed the way we live and work and will continue to have a profound impact on our societies. People now communicate, interact and live differently. Businesses, too, sell services and operate differently because the playing fields of all industries and markets have been altered. Internet access has fundamentally changed the world we live in today.

### Universal access

Much of the focus within today's Broadband space is based on the concept of universal access, i.e. the provision of Broadband access to all for social and economic growth purposes. The South African government's National Broadband Policy for South Africa aims to provide "reliable, affordable and secure services to all citizens".

The South African government committed to release a reviewed version of its Broadband Policy towards the end of 2013. This contains, among other things, the updated definition (below) of Broadband, which will drive the implementation of the policy:

"Broadband is always-on connectivity, where users can access the most demanding interactive content to meet their needs in real time. It's enabled by a high-end ICT platform with the potential to enhance the variety, utility and value of services and applications offered by a wide range of providers to the benefit of diverse users and communities across all sectors of the economy."

### Business enablement

Broadband is also crucial to the operational efficiency and growth of large enterprises and is evolving rapidly to allow organisations more access and improved performance. Broadband drives widespread access to voice, video and data-driven services, many of which are the foundation for internal business process and productivity platforms. Broadband also plays a significant part in enabling multi-channel sales and service channels to customers across all industries.

Broadband is available in fixed and mobile forms and is offered in capped and uncapped packages. Large organisations tend to require both fixed and mobile Broadband to support all their requirements. Fixed Broadband is connected into an organisation's WAN/VPN (Wide Area Network/Virtual Private Network). Mobile bulk Broadband is often purchased as part of an APN (Access Point Name) service, giving mobile users access to the Internet.

Consumers and small businesses are also driving demand for both fixed and mobile Broadband services to support their needs and are being offered a range of mobile and fixed Broadband options to support their specific usage profiles.

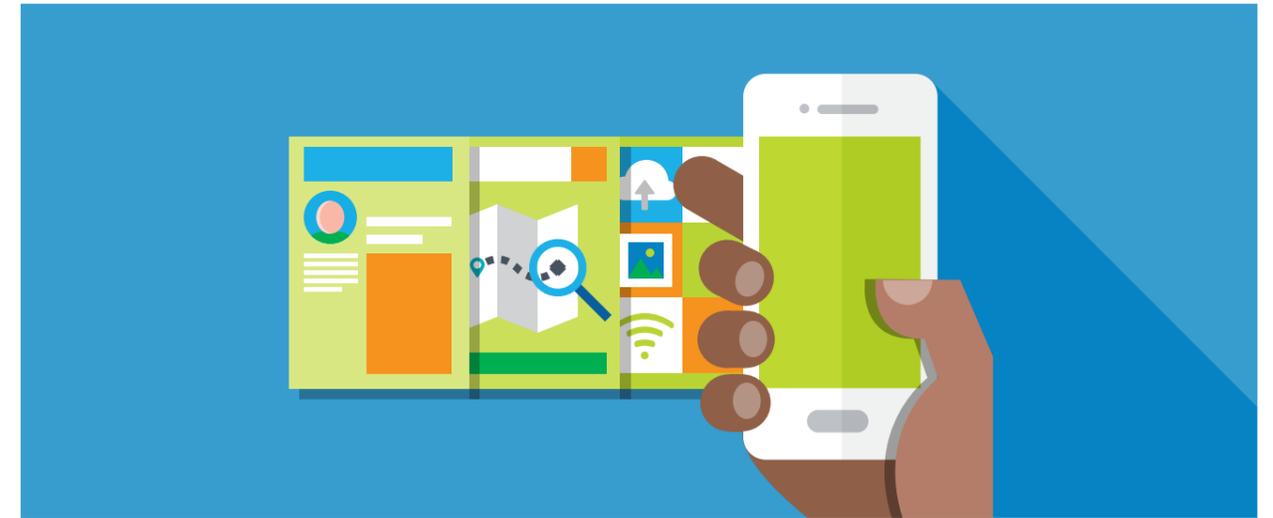
To meet the demand of providing Broadband to the mass needs of citizens and organisations, one needs to understand some of the key challenges facing Broadband in the South African context, including the following:

#### Demand

- Coverage, geography and demographics
- Speed and performance demands
- Affordability expectations
- Changing consumption profiles
- Data explosion

#### Supply

- LTE or fixed (or both)
- How to deliver "universal" Broadband



## South African Broadband trends

### Fixed and mobile Broadband trends

Much of the research and opinion across South Africa is focused on mobile Broadband and on the growth of LTE (Long-Term Evolution) and Mobile Broadband in general. From a universal access perspective, mobile Broadband services are having an obvious impact on the availability of devices and connection points, through which the population can connect.

PwC's South African entertainment and media outlook: 2013 – 2017 predicts that South African spend on Internet access will realise a compound annual growth rate of 24.7%. This means that consumers will spend R59.6 billion on the internet by 2017. This figure stands recorded at R19.8 billion in 2012. According to the report, the majority of Internet access and its associated spend are via mobile access. Mobile Broadband access comprises 89% of the total market and 81% of total spend. PwC's report also indicates that the number of Broadband users within the country was set to increase from 12 million at the end of 2012 to 16 million at the end of 2013.

The report also states that LTE technology has been launched by the major mobile operators. The focus for LTE is said to currently be on business and affluent residential areas, but this technology is set to expand across all areas of the country, increasing the accessibility to, and growth of, Broadband within the country.

A report released by Research ICT Africa in July 2013 states that mobile Broadband in South Africa is "cheaper and faster than fixed-line Broadband". According to the report, the mobile Broadband industry is where the competition within the Broadband space lies, as the mobile market and demand in South Africa are seen to be larger than that for fixed-line Internet access.

The report also indicates that wireless access is the dominant form of Broadband within our households and only 22% of these households have an ADSL line. The remaining percentage is accounted for through mobile phone or mobile modem usage. This focus is, however, more on consumer usage patterns and if focused on the universal access objectives, then mobile Broadband is seen to have the ability to reach a widely spread user base.

However, the high-volume users, who also happen to be concentrated in urban areas (e.g. the super user, SOHO, SME and business users), are the drivers behind much of the Broadband data consumed and are fuelling the forecast doubling of fixed Broadband usage in South Africa in the next two years.

For many services that require consistent performance, or those that require high volumes of data, fixed access is seen as having the ability to offer a more reliable and consistent level of performance and in higher usage scenarios, a more cost-effective delivery network.

Internationally, both fixed and mobile usage are seen to be growing exponentially, and bandwidth intensive applications, such as gaming, file sharing and storage are dominating fixed Broadband services. On the other hand, mobile Broadband services are seen to be dominant in the browsing, social media and video content service areas. Research ICT Africa's study into the performance of Broadband in South Africa, Investigating Broadband Performance in South Africa 2013, highlights some of the trends in the local market and shows support for some of the arguments behind the drivers for fixed and mobile Broadband:

- Mobile Broadband connections are faster than fixed-line connections, but performance is less consistent.
- Latency is as important when assessing the performance of Broadband within the country.

# 02

## Broadband challenges

It is important to note that there are a number of challenges facing Broadband access within South Africa. Sufficient coverage, cost-effectiveness, high speed and high performance are crucially important to all users of Broadband. Broadband service providers have to overcome a number of challenges in order to meet South African consumer and business demands:

### The challenge of Broadband in South Africa



#### Geography and demographics:

South Africa is a large, geographically dispersed country, making access to all areas a challenge. Demographics in South Africa also vary widely, and offerings need to be suitable for each of these markets or LSMs (Living Standards Measures).

#### Data explosion

An increasing demand for bandwidth-intensive applications, such as gaming on the consumer side, and the exponential growth in usage by large businesses that is driven by concepts such as big data, BI (Business Intelligence), Know Your Customer, etc.

#### Changing consumption

In today's increasing online world, certain changes in Broadband behaviour are being noted. These include a move away from simply browsing content to streaming content.

#### Costs of providing Broadband

Significant cost drivers in South Africa include the cost of bringing international bandwidth to South Africa, the cost of hosting services, and the cost of providing the distribution and access network to all users.

In South Africa, the required strategy to reach the ideal balance is one that leverages the advantages of both fixed and mobile Broadband services. This approach is seen to be one where fixed Broadband provision takes the lead in serving the demands for high bandwidth volumes, speed, consistent performance levels, concentrated demand and affordability, while mobile Broadband provision complements fixed Broadband to extend access to sparsely distributed or mobile customers at affordable levels.

#### Fixed

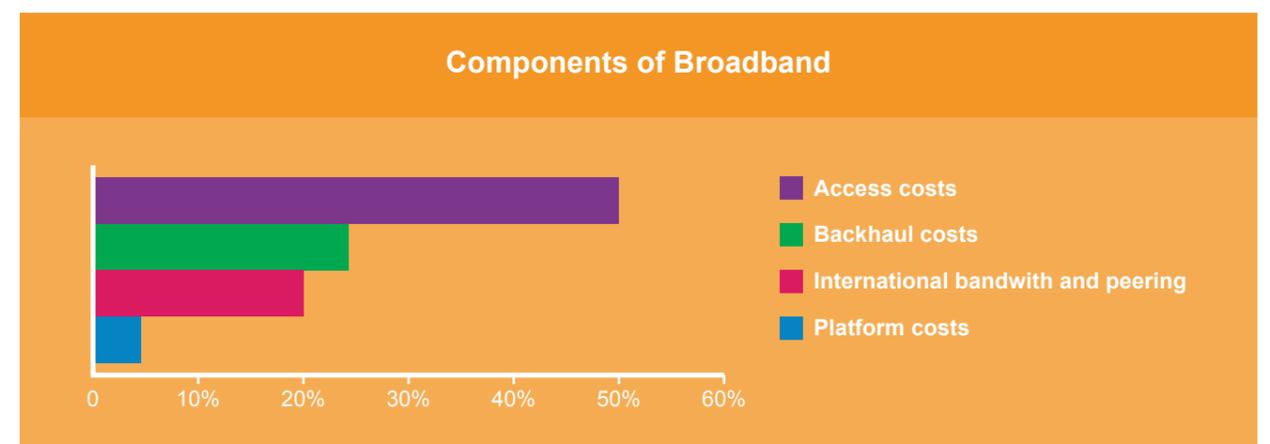
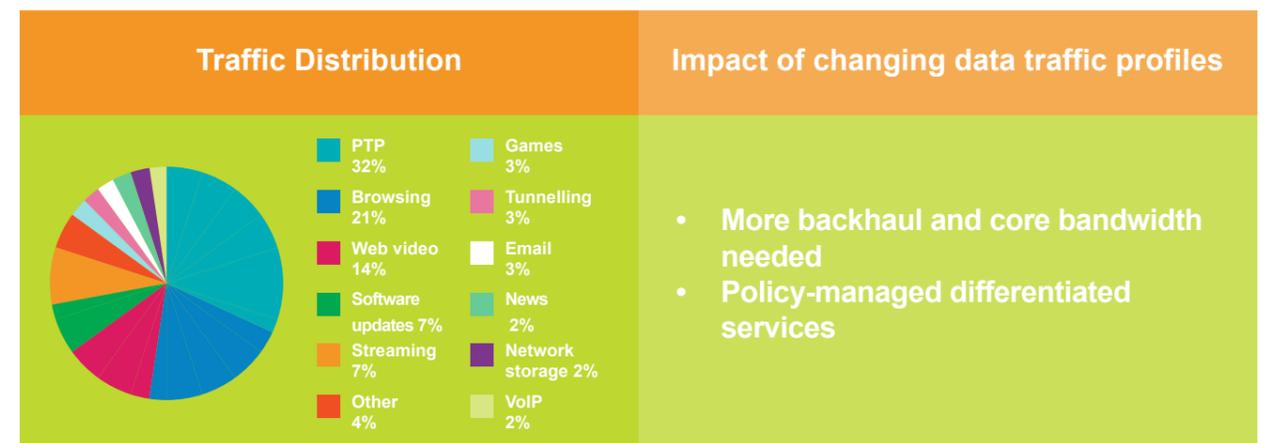
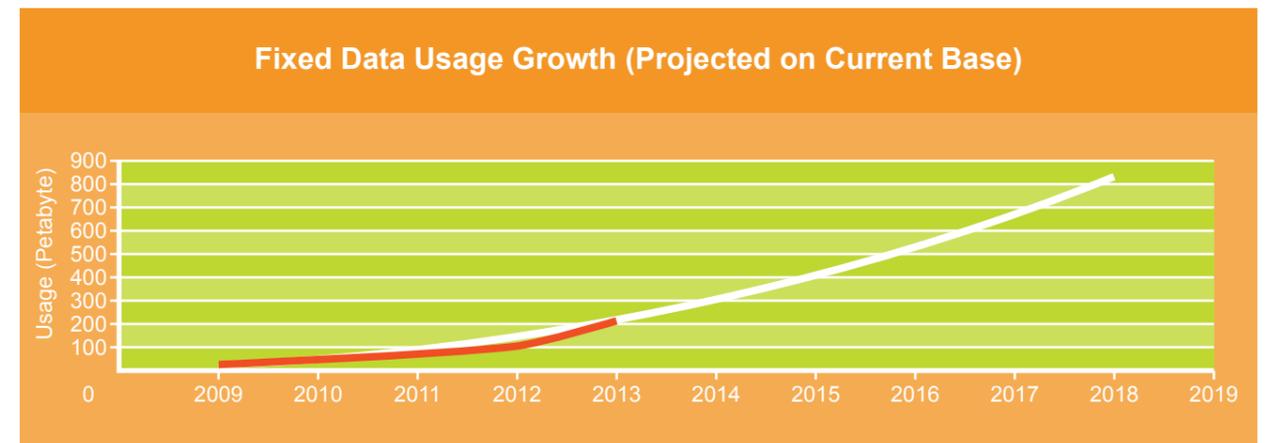
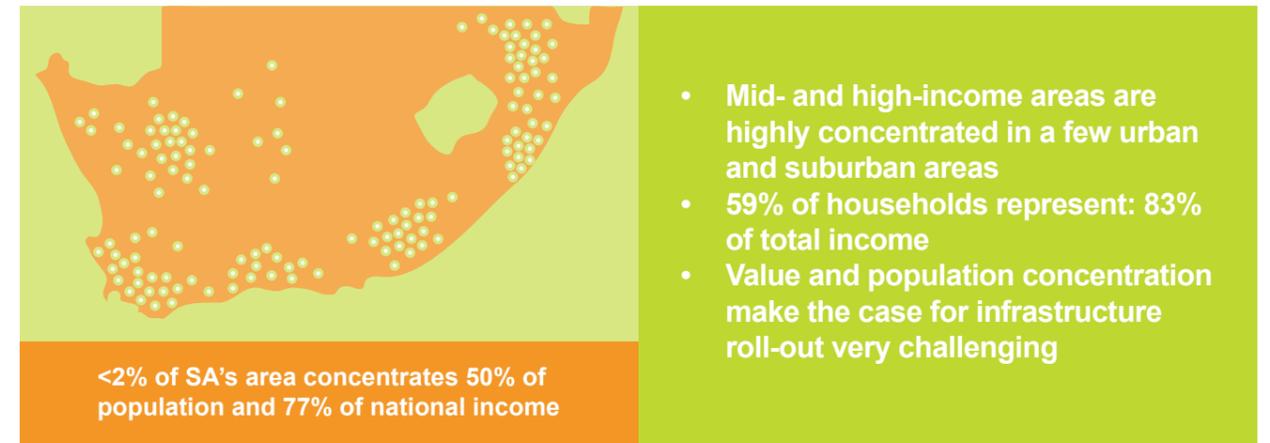
- Cost-effective for high-volume, high-performance usage in concentrated areas.
- Latency sensitive video and other applications.
- Video, gaming, file sharing, storage.

#### Mobile

- Cost-effective for distributed users at lower average volumes.
- Social media, browsing.

#### Building blocks

In order to ensure the successful implementation of broadband, a balanced ecosystem needs to be developed. According to a World Bank Publication called Building Broadband: Strategies and Policies for the Developing World, this ecosystem must consist of quality Internet and high-speed networks, which enable accessibility and its associated applications and content.



## Covering the geography

As mentioned earlier, one of the major challenges to full country implementation of Broadband includes the sheer size and population of South Africa. A mere 2% of South Africa's geographical space contains 50% of the population and 77% of the country's national income. Only 59% of households represent 83% of total income. These concentrations make full infrastructure roll-out very challenging. Providing Broadband access to non-metropolitan areas means providing suitable Broadband products to generate sufficient volume to cover backhaul and access costs. A certain volume of users per centre/area with sufficient uptake is required, as well as automated service repair facilities and remote management capabilities. In order to address the Broadband challenges in South Africa, more power, more spectrum and more base stations are required. Current LTE does not satisfy the demand and must reach a broader customer base.

## Managing the costs

A number of components make up the design of a high-functioning Broadband network. These include:

- **Internet bandwidth:** distance, equipment and content peering.
- **Platform costs:** ISP (Internet Service Provider) platforms and IT systems for fibre access Broadband.
- **Backhaul and head-end:** contention per user and distance to clusters.
- **Access costs:** last mile and support.

Platforms include service platforms and applications to allow for product and service configuration. These costs also pertain to the "central" operational costs of the service provider in question. Backhaul is usually based on fibre-optic technology and is the backbone that connects all the exchanges. Access covers the last mile between the exchange and the customer's premises, including fibre, copper, wireless as well as equipment such as DSLAMs (Digital Subscriber Line Access Multiplexers) and MSANs (Multi-Service Access Nodes). Another vital component to consider is that of the customer's premises, including end-user devices, required modems, routers and Wi-Fi. The estimated contribution of these components, towards the total costs of Broadband, is estimated as follows:

Component	Cost distribution
International bandwidth and peering	20%
Platform costs	5%
IPC and DSL backhaul costs	25%
Access costs	50%

The costs of Broadband within South Africa are being driven down by the over-supply in the market. The supply of international fibre bandwidth around Africa has grown 300x in the 15-year period pre- 2009, and a further 20x during the last 3 years. It is important to note that the base cost of bandwidth in the southern hemisphere is perhaps 10x more expensive than for northern hemisphere operators, due to the following:

- **Distance from core content providers (intercontinental).**
- **Lack of content to offer, from South Africa as an interchange for peering.**
- **The low scale of users and usage in proportion to global usage.**

Cables enabling Broadband and connecting South Africa to the rest of the world now include the following:

- **African Cable System (SEACOM):** links South and East Africa.
- **SAFE:** links South Africa and Malaysia and runs from Melkbosstrand to Penang.
- **Eastern Africa Submarine Cable System (EASSy):** links East African countries and runs from South Africa to Sudan.
- **The Main One Cable:** links South Africa and Portugal crossing West African countries.
- **WACS (West Africa Cable System):** links South Africa and the United Kingdom along Africa's west coast.

The cost of international bandwidth can be reduced with effective tools for caching, local content stimulus and traffic management to counter-balance the cost factors that are driving international bandwidth in the southern hemisphere.

## Balancing fixed and mobile to serve usage needs

The Broadband consumer base is also changing and showing a higher demand for more sophisticated usage patterns. There is a current move away from browsing towards streaming content and gaming, which requires enhanced access and performance from both fixed and mobile Broadband users. Internationally, fixed Broadband usage is largely made up of bandwidth-intensive applications (volume and

latency) such as gaming, file sharing and storage, while mobile usage consists predominantly of video content, ad hoc browsing and social media. Mobile usage remains substantially lower than fixed usage, but both show significant growth.

The table below shows the current estimated overall Broadband traffic distribution within South Africa:

Ranking	Distribution	%
1	Point-to-point	32%
2	Browsing	21%
3	Web video	14%
4	Streaming	7%
5	Software updates	7%
6	Other	4%
7	Games	3%
8	Tunnelling	3%
9	Email	3%
10	News	2%
11	Network storage	2%
12	VoIP	2%

These international and South African usage trends need to be considered against some of the inherent qualities of fixed and mobile Broadband services.

Mobile (LTE) Broadband can be faster than fixed (DSL) Broadband, but is more expensive and less reliable.

Mobile tends to be 4 or 5 times more expensive than fixed, especially with regard to high data usage. Fixed Broadband is consistent and one is almost always guaranteed service. LTE can provide speeds similar to DSL, but they can be variable and difficult to guarantee, given the customer mobility and the fact that bandwidth is shared among customers in the same area. Other elements such as topography, buildings, indoor vs. outdoor coverage and weather can also degrade LTE speeds. DSL speeds are usually dependent on the quality of the copper and backbone contention, together with the distance from

the exchange, both of which can be predicted. This means that in urban areas, where household density is high and fixed Broadband is generally available, LTE is likely to be a sub-optimal solution for home and SME connectivity. LTE is a critical part of delivering inclusive Broadband to South Africa. DSL, on the other hand, is seen as essential to the 21st century large business. LTE and DSL are generally seen as complementary services, both used to achieve the strategic goals of large businesses.

Certain strategies are therefore required to optimally accommodate the growing and changing nature of demand for Broadband services. They are:

- Drive fixed Broadband as primary access medium to optimise delivery efficiency in the South African context.
- Reduce the average costs for bandwidth.

The cost of bandwidth in the southern hemisphere is perhaps 10x more expensive than for northern hemisphere operators, due to:

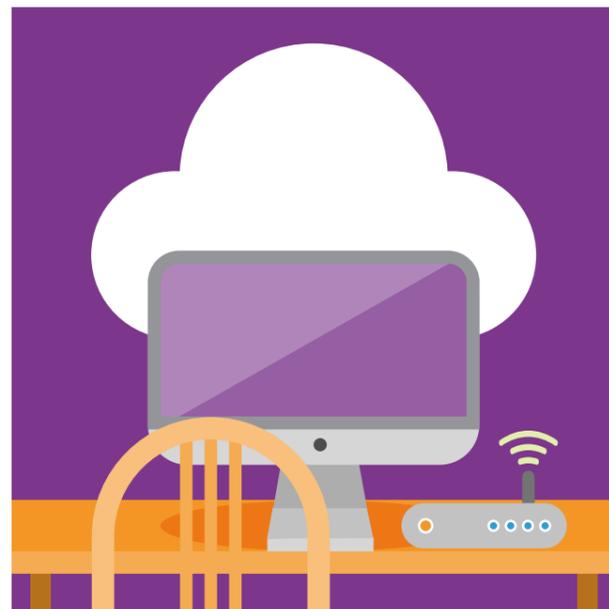
- Distance from core content providers (intercontinental).
- More importantly, lack of content to offer from South Africa as an interchange for peering
- Scale of users and usage.

The cost of international bandwidth can be reduced with effective tools for caching, local content stimulus and traffic moderation.

**Launch policy-based services to provide an equitable experience for all user types:**

This strategy is focused on differentiating by being more application and customer segment aware, and includes the following capabilities:

- Be application and protocol aware, e.g. prioritising games, firmware updates or tunnelling protocols.
- Differentiate on segment level by accelerating or zero-rating popular applications, e.g. social media or movies.
- Managing customer loyalty by offering certain benefits to verticals based on individual trends of use.
- Understanding geographical or time-of-day effects as they affect the experience of all customers.
- Adapt the Internet for corporate use and innovation.
- Drive an aggressive Broadband education programme.
- Leverage LTE as a critical part of delivering inclusive Broadband to South Africa.



# 03

## Business considerations

### Broadband supporting ICT and business strategies

Broadband within large businesses in South Africa is being used for a variety of reasons, all of which are strategically important to the organisation as a whole. Broadband drives online communication platforms, employees' access to the Internet, Unified Communications strategies, online brand campaigns, online sales and customer service transactions, remote working, the digitisation of company data, and the use of Internet-based services and applications such as cloud-hosted applications, that depend on the availability of the Internet.

Broadband access is continuously growing in importance to large enterprises in order to improve operations and increase profitability. The risk management benefits of Broadband are also of great importance, allowing for the electronic storing and backup of information.

Cloud computing is taking the world by storm, and large enterprises are considering, or have already implemented, a move to cloud technologies. Cloud computing is based on the secure usage of remote servers to store, access, manage and control all aspects of a required company network. This can significantly drive down costs, provide a flexible and scalable environment to support the growth of an organisation, improve security, and increase mobility and collaboration within an organisation. Cloud technologies rely entirely on high-speed and high-performing Broadband capabilities.

It would seem that although South African Broadband access and performance are seen as being below par when compared to its global counterparts, large South African enterprises realise its benefits and demand high-speed and high-quality Broadband in order to stay abreast of the times.

If the opportunities that Broadband can bring to a business are realised, then Broadband can assist in improving internal productivity, reducing all costs, improving customer interaction and satisfaction and the overall growth of the business. A number of international and local companies have realised and continue to realise the assistance that Broadband can provide in managing and growing an organisation.

The United Kingdom's National Health System (NHS) is using Broadband to simultaneously improve patient care and lower its carbon footprint. The implementation of the N3 Broadband network by BT has allowed for the movement and sharing of critical information and reduced patient and staff transport needs. The NHS creates 18 million tonnes of CO<sub>2</sub> every year and 1/5 of this figure is due to high transport requirements. Video-conferencing, remote staff access, electronic sending of prescriptions, a centralised archiving system and an online booking platform for patients are some of the initiatives making certain NHS bodies greener and far more productive.

A report released by Connected Tennessee, titled **Broadband: Empowering Women-Owned Businesses** states that these businesses realise 31% of their revenue from online transactions. This translates to \$967 million in revenue in the state of Tennessee on an annual basis.

Tourism Queensland in Australia used Broadband effectively to launch a recruitment campaign. The department put together an online campaign and asked for applications in the form of the submission of promotional video entries. It received more than 34 000 entries, news coverage around the world and millions of hits to its website. This shows that an effective online campaign can achieve enormous positive results.

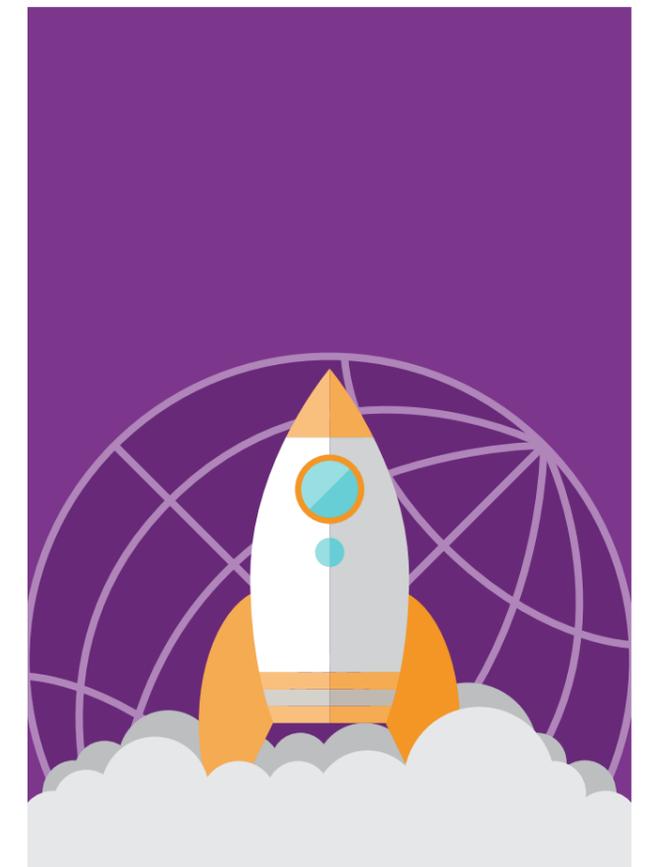
A number of SMEs (Small and Medium Enterprises) in Suffolk, England, have communicated the benefits that Broadband have brought to their businesses. Obsidian Consulting, in particular, has mentioned Broadband-based video-conferencing and cloud computing solutions as crucial to improving the company's productivity by reducing travel time and allowing for the sharing of information. In a South African hypothetical case study on the SME level,

John's Executive Shuttle, operating from East London in South Africa, has experienced some of the benefits that Broadband can bring to a productive and profitable SME. The organisation employs two management employees and 1 PA in the office. It has eight mobile employees who are constantly on the road. The company requires real-time interaction with customers and fleet.

Using Broadband services, the company has, in addition to website hosting, benefited from the following services:

- Supporting IP PBX on site with exchange server.
- A CRM and HR payroll system.

Organisations of all sizes should continuously assess whether they are achieving the highest speeds and performance possible in order to take advantage of all the opportunities that Broadband can offer their particular size of business. It is crucial that companies partner with service providers that cannot only provide them with the best possible Broadband options, but can also assist in the implementation of Broadband-based solutions in order to improve overall productivity and profitability.



# 04

## Serving South African Broadband needs

### Addressing Broadband needs

A Broadband network design is not only about high volume, there are a number of components that need to be carefully balanced to ensure both universal access and business enablement demands are met.

Service providers need to understand the following facts about the Broadband landscape in South Africa in order to balance the current geographic, performance and cost challenges (and serve the needs of the modern consumer and business use).

Service providers need to have a solid understanding of the intricacies involved in balancing, inter alia, the following:

- Fixed and mobile Broadband supply (separately and complementary to one another).
- Volume and speed demands of differing types of consumer and business users.
- Changing nature of data traffic profiles (peer-to-peer, browsing, web video, streaming, storage, etc.).

Fixed Broadband is essential and preferable. Although mobility is crucial, this is used predominantly where a fixed-line is not available. Being able to offer the best of both worlds and understanding the correct and complementary use of mobile and fixed Broadband are critical for both the consumer and business user, whether they be located in a major city or a remote rural location.

The race for content is on. Previously, providing access to local and international Broadband at acceptable cost and performance standards proved to be the competitive challenge for service providers. The new differentiator is going to be the provision of industry-specific content (e.g. education) or consumer-focused content (e.g. media/TV) to enable consumer and business services. This will change the game from providing Internet access to providing user-specific content and services.

Telkom has been instrumental in the provision of high-speed and high-performance Broadband to the South

African market. Not only is Telkom a major competitive leader in the business sector, but it's also crucial to universal access.

Telkom is key to the South African government's Broadband policy and works hand-in-hand with relevant players to enable a wider footprint of coverage in the country. Telkom focuses on efficiency and service performance and ensures that its operating model is relevant to the markets with which it engages.

Telkom Business, through its considerable fibre network, is able to offer extensive fixed Broadband packages to suit a variety of business types and requirements. Telkom Business offers high-speed access and transport technologies that yield high performance and consistent availability.

In addition, Telkom's mobile Broadband services increase their capability to meet as many consumer, ICT and business needs as possible through a balance of fixed and mobile offerings. Telkom makes continuous investments in its mobile and fixed networks.

**Telkom's strategy is to transform into a data-centric operator enabling super-fast Broadband.**

