VPN / WAN

VIRTUAL PRIVATE NETWORKS & WIDE AREA NETWORKS

CONSIDERATIONS FOR LARGE ENTERPRISES OPERATING IN SOUTH AFRICA
MAY 2013

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STRATEGICALLY CREATING BUSINESS SUCCESS

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INTRODUCTION

The key to remaining competitive lies in an organisation's ability to respond quickly to market changes. For many organisations these changes are largely driven by advances in technology. It is well understood that developing agility within your technology infrastructure will enhance your competitive edge.

Nebula has seen an interest from enterprise organisations to understand the key considerations for selecting, implementing or managing their Virtual Private Network (VPN) / Wide Area Network (WAN) to cost-effectively allow them to connect their South African and African footprint and support their strategies for providing reliable and high-performance converged services over their distributed business network.
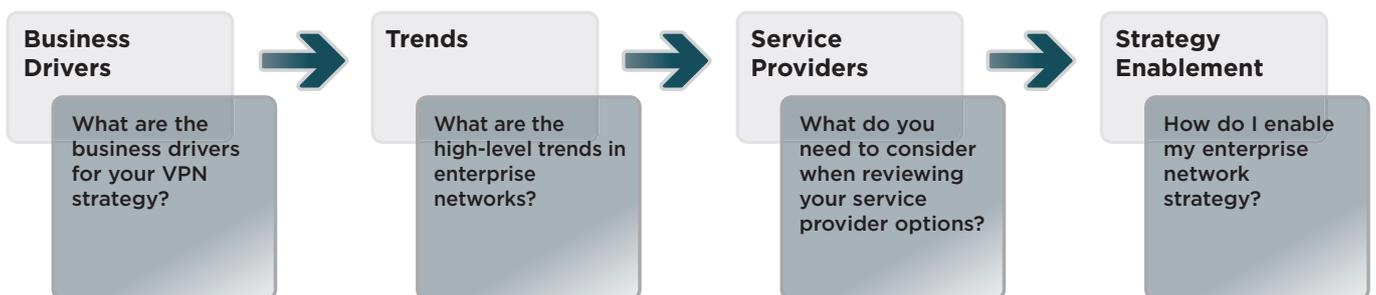
As part of its ongoing development of decision support knowledge for large organisations, Nebula provides insight into VPN / WAN solutions. This information is intended to assist organisations in understanding the potential for enabling their business objectives through their distributed network.

WANs represent the veins and arteries of the corporate organisation and support the flow of all converged data to centralised enterprise systems to enable an increasing range of business activities. Large corporates are now seriously increasing their dependency on their networks as they move to add voice and video services and, at the same time, increase the centralisation of their data centre infrastructure.

WANs for large enterprises are predominantly enabled through VPNs that allow remote sites to connect securely to each other through public telecoms infrastructure.

Forward-looking organisations are preparing for the future of selectively tapping into third-party hosted services and converting to a pan-African or global network footprint.

This review provides a perspective on the following aspects of managing your VPN / WAN strategy:

Business Drivers		**Trends**		**Service Providers**		**Strategy Enablement**
What are the business drivers for your VPN strategy?	→	What are the high-level trends in enterprise networks?	→	What do you need to consider when reviewing your service provider options?	→	How do I enable my enterprise network strategy?

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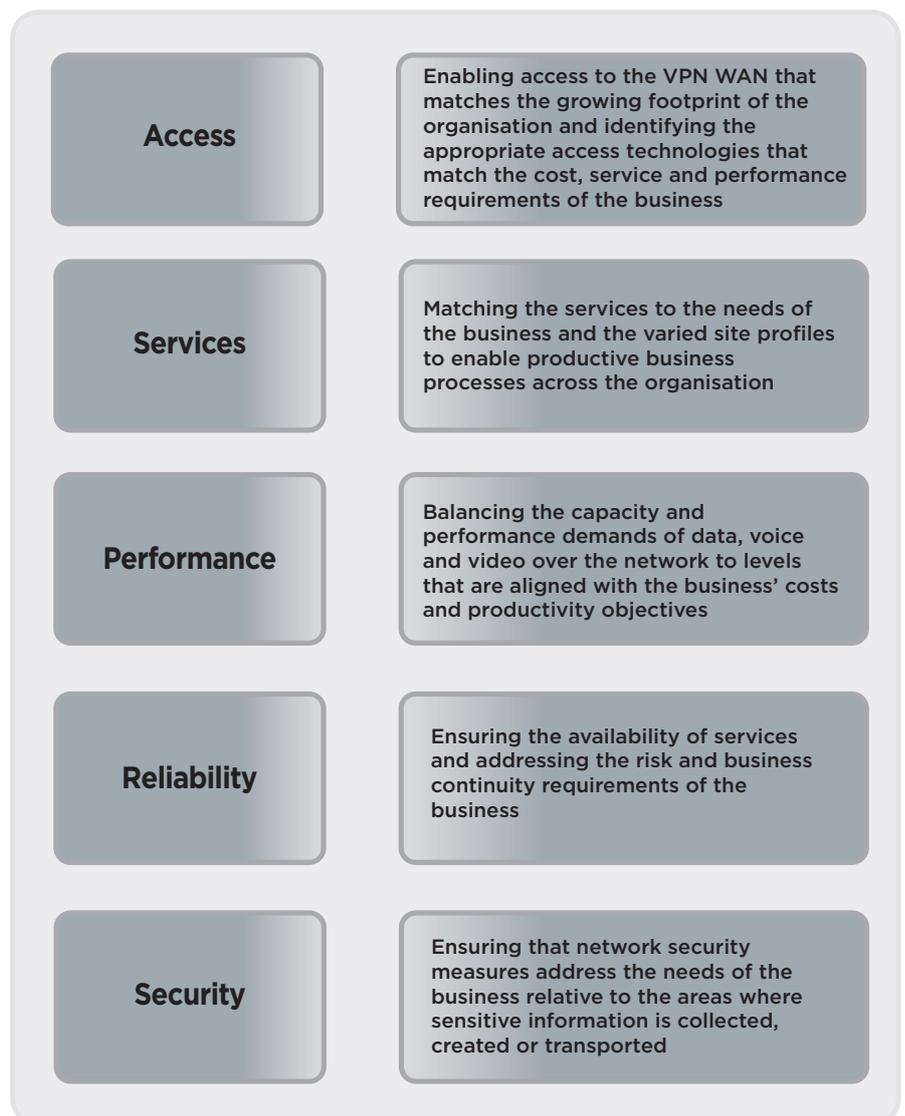
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WIDE AREA NETWORK CONSIDERATIONS

BUSINESS DRIVERS

While there have been significant advances in the underlying network technologies, organisations are still not seeing the benefits of improved productivity in business processes. Technology divisions will have to enable their corporate networks to be able to offer the reliability and performance to support collaboration and integrated data, voice and video communications into business processes.

In addition, providing cost-effective access to the business' areas of operation, allowing communication with centralised data centres, and ensuring business continuity are some of the key objectives of a well-managed network.

Access	Enabling access to the VPN WAN that matches the growing footprint of the organisation and identifying the appropriate access technologies that match the cost, service and performance requirements of the business
Services	Matching the services to the needs of the business and the varied site profiles to enable productive business processes across the organisation
Performance	Balancing the capacity and performance demands of data, voice and video over the network to levels that are aligned with the business' costs and productivity objectives
Reliability	Ensuring the availability of services and addressing the risk and business continuity requirements of the business
Security	Ensuring that network security measures address the needs of the business relative to the areas where sensitive information is collected, created or transported

WIDE AREA NETWORK CONSIDERATIONS

In South Africa, the waves of WAN strategies have been to migrate to Multiprotocol Label Switching (MPLS) VPN services and to reduce costs. Organisations will need to consider what their future objectives are for enabling a high-performance, highly accessible and highly reliable network.

The various phases in the history of South Africa VPNs are put in context as follows:

Phase 1 **Initial VPN Outsourcing**	The primary driver was to collapse the core network, thereby outsourcing the equipment and management costs for provision and support. The incumbent fixed-line telco was in a position to offer access services at a lower cost and therefore captured many of the large enterprise contracts. Other service providers gained market share in the large to medium corporate segment, primarily because of their network support and integration capabilities. Back-up was generally enabled through ISDN or GPRS (later Edge) services.
Phase 2 **Optimise Costs**	The primary driver was to renegotiate with the incumbent telco or conduct benchmarking or Request for Proposal (RFP) exercises to test market pricing for services. The installation and rental costs for the primary access medium (i.e. X.21) were still a competitive issue.
Phase 3 **Improve Functionality and Flexibility**	The current drivers are to enable the network to run data, voice and video. The cost and performance balance of running voice and video services over the VPN are still a challenge, with organisations still running separate technologies to support these services. Gradually organisations are moving to enable their centralised or major offices (on both a WAN and LAN level) to be ready to support a wider range of services. Branch or store environments are still a challenge as the business case for increasing services, based on the costs of bandwidth, is not seen to be viable. While capacity and redundancy issues in the core of the network can be adequately managed by the VPN provider, the flexibility and costs for capacity and redundancy in the access network still remain a concern. WAN and application performance optimisation strategies are being deployed to support improved performance and reduce costs across the network.
Phase 4 **Offer Seamless Services**	Aside from improving the overall access, performance and stability of the network, large enterprises are driving towards unified communications, integrated applications and business processes over the network. This will require organisations to be in a position to cost-effectively provide services to all users, irrespective of location. Additionally, organisations will have to work out how to optimally manage the full-range of converged services on their network. LAN and end-user devices and applications will, at the same time, have to be transformed to take full advantage of the capacity and capability of the VPN.

Organisations have to align their current networking objectives with the phase they are in and understand the related challenges, which may differ from business area to business area.

WIDE AREA NETWORK CONSIDERATIONS

TRENDS IMPACTING VPN / WAN STRATEGIES

Some of the trends that will have an impact on VPN / WAN strategies include the following:

- The growing demand for capacity in the network, driven by VoIP / SIP, mobility, internet, video and cloud services

- The increase in the number of connections to the network, driven by private connections, business growth and connections to cloud services

- The growing dependency on the capacity and performance of the internet

- The need to open the network to new users and services (and devices) while at the same time managing security requirements

- The continual centralisation and consolidation of data centres and the locations of primary and secondary data centre locations (private and public)

- The drive to access new markets in South Africa, the rest of Africa and globally

- The ongoing deployment of new enterprise-wide applications

- The pressure on costs and the ongoing drive for lowering overall network ownership and management costs

- The drive for standardisation of technologies, including network standardisation, consolidation and simplification

- The business expectation of improving business process efficiency (by optimising application performance over the networks)

- The need to manage multiple traffic types, and the expectation to have some flexibility in classes of service (CoS) and management of quality of services (QoS).

- The increasing importance of security and policy management as data security requirements expand

- The drive and expectation for efficient on-demand services

Large enterprises should maintain an ongoing view of the relevance of these factors to their own enterprise network strategy, and then use this understanding as a basis to set objectives and determine performance expectations, both internally and from their service providers.

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WIDE AREA NETWORK CONSIDERATIONS

REVIEWING SERVICE PROVIDERS

Many large enterprises review their incumbent service providers against contract or SLA performance and then get a broader view of the market offerings when they decide to conduct an RFP.

In terms of the strategic importance and the changes in market, both on an access level and on a cloud level, it is suggested that large enterprises should maintain an up-to-date view on developments across the major service providers so that they can decide how best to leverage these developments and opportunities.

The following are some of the high-level areas to consider when reviewing your incumbent supplier, benchmarking your service or evaluating potential new suppliers:

Access	In South Africa, to what extent can the service provider offer cost-effective geographical coverage through a flexible range of access mediums, both primary and back-up?
	In the rest of Africa, for South African based multi-nationals, where can the service provider offer connectivity directly with their own nodes or indirectly through NNIs (Network-to-Network Interfaces)?
	Globally, for South African based multi-nationals or global companies with an African presence, what service providers do they partner with to provide international coverage aligned to the locations of your strategic business operations?
Services	Does the service provider have extensive self-owned infrastructure and internal capabilities to support related managed services?
	Can they supply and manage your networking equipment, data centre services, voice services (TDM, VoIP and SIP), LAN services, internet services, wireless and mobile services, unified communication services, cloud services and security services?
	Can they offer professional services to support your network integration requirements and your expectations for WAN optimisation and application performance management?
Experience	Does the service provider you are dealing with have experience with organisations of a similar size and geographical footprint?
	Are they familiar with the needs of your vertical industry and have they demonstrated experience in dealing with different verticals?
Commercials, Service Quality and Support	Are they competitive and flexible in terms of the costing of their services including port fees, CPE (Customer Premise Equipment) rental and management, CoS (Class of Service) fees, installation fees and network management fees?
	Is their billing transparent and does it allow you to easily predict changes in demand?
	Do their self-management and reporting portals and tools allow you to easily manage and report on the environment?
	What is the experience in the industry of the quality of service, speed to implement and overall service levels, customer services and support?
	Do they display the required service management maturity in supporting end-to-end service delivery and management?
	Are they a suitable primary or secondary vendor to support either different geographical areas or be a provider of your back-up services?
	Do they display innovation and flexibility in various areas such as commercial, technical solution design, network management or network performance optimisation?
	Do they demonstrate understanding of the required controls to address your risk and security requirements and are their standards and governance models transparent?

SERVICE PROVIDERS

The South African service provider market consists of various companies that are either traditional South African companies, or those that have been bought by or have significant international ownership or global providers that are supplying services into Africa.

BT Global and Orange Business are service providers that traditionally focus on global multi-nationals that are operating across Africa. However, they are both extending their interest into Africa and should get to a point where they can leverage their global capabilities and access into global data centres and hosted services. This is more likely to become a possibility with the increasing access of connectivity both into Africa and within Africa.

Internet Solutions has, like all the other service providers, made their own investments into capacity building initiatives and is in a position to be able to aggregate access options (mobile / wireless and fixed-line). MTN Business and Vodacom Business, both traditional mobile network providers, have also made investments into fixed connectivity and infrastructure and offer a wide range of enterprise networks and infrastructure offerings.

Neotel has established some competitive offerings to serve the enterprise market and, at the same time, is competing for the last-mile market and is growing its national footprint. Telkom now has its own mobile network and is known for its wide last-mile coverage of the local market and can therefore cover highly distributed large enterprises within South Africa.

All the service providers have some form of arrangement to offer extended access into other African countries and a broader global footprint through agreements with other global network players.

These providers need to be evaluated as long-term strategic partners by considering some of the following factors:

Connectivity	Reach, performance, costs and flexibility of access options
Service offering	Breadth of service offering - access, hosting, managed networks, communications, cloud services, etc.
Depth of support	Ability to offer end-to-end support for telecommunications solutions from planning to design, implementation, integration, operation and optimisation
Support levels and support footprint	SLAs and general levels of support across multiple regions and / or countries
Partnerships	Global network partners, related IT or telco investors, OEM partnerships
Vertical focus and experience	Familiarity with the specific needs of your industry and experience in the industry and territories in which you operate

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SERVICE PROVIDERS

To match an organisation's current and planned footprint, companies should develop an understanding of the ability of their service provider to offer coverage within their operating territories.

The service providers and their traditional coverage approach shown below need to be considered against their expanding ability to offer end-to-end SLAs directly, or through their partnerships with other local or international players.

	South African Coverage	African Coverage	Global Coverage	International Business Partner with Coverage
BT		✓	✓	
orange		✓	✓	
internet solutions	✓	✓	Through various partner arrangements with international telcos	NTT Communications
MTN Business	✓	✓		
Neotel	✓	✓		TATA COMMUNICATIONS
Telkom Business	✓	Limited Coverage		
vodacom	✓	Gateway		vodafone

This report serves as an introduction to the service providers and a high-level overview of these providers. Nebula will provide more in-depth reviews of the access options and VPN solutions offerings from these companies in the near future.

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SERVICE PROVIDERS

International Service Providers

BT Global Services

Company	BT Global Services has a presence in 197 countries and territories worldwide. BT established sub-Saharan African headquarters in South Africa in 1992 and are a world leader in the design and operation of mission-critical networked IT services that support the core processes of the world's leading companies, telecoms providers and governments. BT aims to provide best-of-breed managed network services for multinational companies operating in Africa, and providing expertise to the national operators to improve their retail and domestic market offerings to their respective citizens. BT has experience across all industry sectors but has unrivalled expertise in financial services, oil and gas, government, healthcare, media and broadcast, and transport and logistics.
Website	http://www.globalservices.bt.com/ssaf/en/home http://www.globalservices.bt.com/ssaf/en/products_category/network_services
Some Recent Developments	BT has recently made announcements about a renewed focus on Africa and sees South Africa as a hub for sub-Saharan Africa. These announcements include investments in additional infrastructure and skills in the region. It has established new fibre connections into South Africa and setup new NNI agreements to take services out of South African into 12 other African countries. Domestically, BT has bought capacity on the fibre optic network (to be built by Fibreco, a joint venture between Cell C, Convergence Partners and Internet Solutions) that will link Johannesburg, Bloemfontein, Cape Town, East London and Port Elizabeth. BT has recently signed a reported five-year, R1.8 billion deal with Anglo America to provide its managed network services globally, specifically their operation in South Africa, Brazil, Chile, Australia and the UK.

Orange Business Services

Company	Orange Business Services is a global integrator of communications solutions for multinational corporations. With the world's largest network for voice and data, Orange Business Services reaches 220 countries and territories with local support in 166 and provides a range of communication services covering cloud computing, enterprise mobility, M2M, security, unified communications, videoconferencing, and broadband.
Website	http://www.orange-business.com http://www.orange-business.com/en/networks
Some Recent Developments	Orange extends African IP VPN Services - France's Orange Business Services will offer IP VPN services for Aggreko, a company that provides power and temperature control services globally and within Africa.

SERVICE PROVIDERS

Local Service Providers

Internet Solutions

Company	Internet Solutions is a wholly-owned subsidiary of Dimension Data which in turn is wholly owned by NTT.

Internet Solutions (IS) provides its services to small, medium, and large organisations. IS targets the African market as well as African organisations connecting globally and global organisations connecting to Africa. |
| **Website** | http://www.is.co.za
http://www.is.co.za/OurSolutions/Connectivity/Pages/Managed-Data-Network-Services.aspx |
| **Some Recent Developments** | Internet Solutions has upgraded its IP Connect with Telkom in both Cape Town and Johannesburg.

IS launched its network OVC (Optimisation, Visibility, Control) solution, which enables organisations to achieve a consistent end-user quality of experience (QoE) as a means to increase their business efficiency and agility.

IS has boosted its ability to deliver capacity on the West Africa Cable System (WACS) to clients, following the launch of a fibre optic cable ring between the WACS landing station and the IS Cape Town Internet Data Centre (IDC) facility.

IS and ATC South Africa have signed a five-year contract under which IS will use ATC South Africa's towers to expand its delivery of current wireless solutions, and position it to offer Long Term Evolution (LTE) or 4G broadband services when those are enabled in South Africa.

IS Mozambique has rolled out its first comprehensive point-of-presence (PoP) network in the four main remote locations in Mozambique. |

Neotel

Company	Neotel provides a range of value-added voice and data services for businesses, wholesale network operators and consumers using their pure-IP Next Generation Network.
Website	http://www.neotel.co.za/
http://www.neotel.co.za/wps/portal/neotel_business
Some Recent Developments	Jasco has delivered a national transmission network for Neotel. Telecoms and internet services in the South Africa market are set to get a major boost with the installation of this new national network.

Neotel is planning USD 58 million in capital expenditure this fiscal year.

Neotel and the Wireless Access Providers' Association of South Africa (WAPA) have partnered to extend Neotel's last mile access footprint to provide companies and consumers with broadband services. |

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MTN Business

Company	MTN Business is the business division of the MTN Group, focused on providing business communications solutions to small-to-large businesses and the public sector.
Website	http://www.mtnbusiness.co.za http://www.mtnbusiness.co.za/ProductsServices/NetworkSolutions/Pages/Overview.aspx
Some Recent Developments	MTN has lit up its portion of the National Long Distance (NLD) fibre network between Johannesburg and Durban. The joint terrestrial fibre grid being built by MTN, Vodacom, Neotel and the SA National Roads Agency (Sanral) has seen headway with the lighting up of a route between Gauteng and KwaZulu-Natal. MTN to launch its Cloud Service Brokerage model into Africa. MTN Uganda said it plans to invest USD 70 million to expand its network over the next year. As MTN Uganda continues to cement its position, it has now launched a new Wi-Fi service with a number of MTN hotspots around the country. The hotspots will be available to MTN and non-MTN customers. MTN has started installing a Long Term Evolution (LTE) network in Uganda, a 'standard for wireless communication of high-speed data for mobile phones and data terminal', popular known as 4G technology. MTN Zambia is to invest EUR 36.6mn in technology upgrades in the forthcoming year. MTN Nigeria has said that it would invest $1.3 billion in infrastructure upgrade and expansion in the upcoming year. MTN Nigeria has commenced a comprehensive network modernisation and swap-out exercise that is expected to cover its extensive network across the country over a span of nine months. MTN is set to launch 3G services in Ivory Coast. The new network is due to start operating in the capital of Abidjan, according to a report from Agence Ecofin.

Telkom Business

Company	Telkom Business is the business unit dedicated to serving businesses of every type, industry and size in and outside South Africa. The businesses that they serve range from small and medium enterprises (SMEs) to large corporations, government organisations and global enterprises.
Website	http://business.telkom.co.za/ http://business.telkom.co.za/enterprise/data-networks/
Some Recent Developments	Former Telkom CEO Nombulelo Moholi said that Telkom has no immediate plans to increase its investment in submarine cables as there is enough international bandwidth for now. In their latest Annual Report, Telkom has shared its intent to grow their share of the VPN market into the medium business sector. Telkom plans to launch a fibre-to-the-home trial network.

SERVICE PROVIDERS

Vodacom Business

Company	Vodacom Business was launched in 2008 offering converged business network and IT services such as access services, managed network services, converged application services and managed hosting services.
Website	http://www.vodacombusiness.co.za/corporate/home http://www.vodacombusiness.co.za/corporate/networkandinternetservices/internet_home
Some Recent Developments	Vodacom Business launches a PBX cloud solution. Vodacom Tanzania has announced that it would have the second stage of its backbone 3G link up and running within the near future. Vodacom now has numerous LTE enabled base stations, including Cape Town. Vodacom Business will soon start trialling fibre to the premise (FTTx) as part of a bigger plan to offer fibre connections to the small business and potentially the residential market.

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SERVICE PROVIDERS

UNDERSTANDING VPN OFFERINGS IN THE SA MARKET

The following provides an understanding of how VPN offerings are structured by service providers in the South African and African markets. Nebula recommends using the guidelines below in order to understand the breadth of services offered by a service provider and to make an informed decision for your organisation.

Access Mediums

Knowledge of which terrestrial mediums are provided as part of a VPN solution:

- X.21
- DSL
- Fibre

Knowledge of which wireless access mediums are provided as part of a VPN solution:

- GSM
- Satellite
- Point-to-point microwave
- Shared-spectrum wireless

Access Coverage

Knowledge of which access mediums are supported in other African countries?

- Leased line
- DSL
- Fibre
- GSM
- Satellite
- Point-to-point microwave
- Shared-spectrum wireless

Services in Africa

In how many African countries can the service provider supply services and support:

- Directly through their own in-country presence?
- Indirectly through in-country partners?

How many local and international POPs and NNI partners (if applicable) are in the specified African countries?

Classes of Service

- Obtain relevant information about the classess of service that the service provider offers in their VPN solutions including:
- Does the service provider do any shaping or policing of traffic at the customer edge (CE)?
- Does the service provider allow bursting between classes of services (up or down)?
- Does the service provider have any bandwidth allocation rules regarding the classes of services (maximum % of access that can be allocated to a specific CoS)?

SERVICE PROVIDERS

VPN Service Charges and CPE Equipment

Information on the applicability of the following service fee items and a broad indication of the pricing variables for each item:
- Access circuit charge
- Port fees
- Bandwidth fee / CoS
- CPE rental
- Network management (per CPE device)

An indication of the CPE equipment that the service provider supports and the relevant level of certification (if applicable)?

Service Levels And Value-Added Services

High-level feedback with regards to how the service provider's service levels are structured in the following areas:
- Service request fulfilment
- Availability
- Performance (latency, jitter, packet loss)
- SLA exclusions

Information on the WAN optimisation products that the service provider utilises.

Information on the monitoring tools or services that the service provider offers for network and application performance monitoring.

Service Value Proposition

Feedback with regards to why the service provider believes that its VPN solution is ideally positioned for large enterprises in South Africa and the rest of Africa.

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SERVICE PROVIDERS

HIGH-LEVEL PROFILE OF TIER 1 VPN OFFERINGS IN SOUTH AFRICAN AND REST OF AFRICA

The following data tables provide a view on initial feedback from some of the Tier 1 VPN Service Providers in South Africa.

Access Mediums and Coverage (South Africa)

	Internet Solutions	Neotel	Vodacom
Terrestrial			
X.21	Telkom Diginet	Only available in certain locations using 3rd party access	Yes
DSL	Telkom ADSL	No	Yes
Fibre	IS Fibre, Neotel, Telkom, Ethekwini Fibre, DFA	This is the preferred medium	Yes
Wireless			
GSM/3G/LTE	Yes	Available via 3rd parties	Yes
Satellite	Yes	Yes	Yes
Other	Wi-Band (LMDS), Microwave	Microwave and WiMax, where needed and feasible	Wireless

(Note: Feedback was not received from MTN Business and Telkom at time of going to press)

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SERVICE PROVIDERS

African Access Coverage (Internet Solutions Example)

	Internet Solutions						
	Leased Line	**DSL**	**Fibre**	**GSM**	**Satellite**	**Licensed Spectrum**	**Unlicensed Spectrum**
Namibia	✓	✗	✓	✗	✓	✓	✓
Botswana	✓	✗	✓	✓	✓	✓	✓
Mozambique	✓	✗	✓	✓	✓	✓	✓
Angola	✗	✗	✓	✗	✓	✓	✓
Zambia	✗	✗	✓	✗	✓	✓	✓
Tanzania	✗	✗	✓	✗	✓	✓	✓
Uganda	✗	✗	✓	✗	✓	✓	✓
Kenya	✗	✗	✓	✗	✓	✓	✓
Malawi	✗	✗	✓	✗	✓	✓	✓
Zimbabwe	✗	✗	✓	✗	✓	✓	✓
Nigeria	✗	✗	✓	✗	✓	✓	✓
Ghana	✗	✗	✓	✗	✓	✓	✓
Ivory Coast	✗	✗	✗	✗	✓	✗	✗

African Country Support

	Internet Solutions	**Neotel**	**Telkom**	**Vodacom**
Direct in-country support				
In how many African countries (excluding South Africa) can you provide services and support directly through their own in-country presence?	6	They do not have direct presence, i.e. license operator status in any country.	6	Nigeria, Ghana, Zambia, Kenya, United Kingdom, United States, and Singapore
Indirect in-country support				
In how many African countries (excluding South Africa) can you provide services and support indirectly through in-country partners?	5	They do have an MPLS PoP in the following countries through their relationship with TCL: Kenya Nigeria Ghana In the process of negotiating with a further 10 countries and aim to close these agreements within 2 – 6 months.	8	They've got global interconnect agreements which enable them to offer service to almost any country.

(Note: Feedback was not received from MTN Business at time of going to press)

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SERVICE PROVIDERS

Direct Connections to Cable Landing Stations

	Internet Solutions		Neotel		Telkom (Africa)		Vodacom	
	Cable Landing Stations	NNI Partner	Cable Landing Stations	NNI Partner	Cable Landing Stations	NNI Partner	Cable Landing Stations	NNI Partner
South Africa	SAT3, SEACOM, WACS, SAFE		SAT3, SEACOM, WACS, SAFE, EASSY		Yes		SAT3, Mtunzini	Neotel
Namibia	WACS				Yes		Windhoek	Telkom SA, ITN
Botswana					Terrestrial		Gaborone	Gateway Carrier, VBN, Telkom SA, BTC
Mozambique	SEACOM				Yes		Maputo	
Angola	WACS				Yes		Luanda	
Zambia						Yes	Lusaka	Gateway Carrier, Liquid Telecom
Tanzania	SEACOM and TEAMS				Yes		Dar Es Salaam	
Uganda						Yes	Kampala	Orange, BCS
Kenya	SEACOM				Yes		Mombasa	
Malawi							Blantyre	Skyband
Zimbabwe					Terrestrial		Harare	Liquid Telecom
Nigeria	SAT3, MAINOne, WACS				Yes	Yes	Lagos (Marina, Lekki)	
Ghana	SAT3, MAINOne, WACS				Yes		Accra	
Ivory Coast					Yes		Abidjan	
Mauritius							Ebene	
Madagascar							Antananarivo	
Djibouti							Djibouti	
Cameroon							Douala	
Gabon							Libreville	

SERVICE
PROVIDERS

International NNI Partners

NNI Partner	Internet Solutions	Neotel	Telkom	Vodacom
NTT	Asia			
Masergy	Europe			
L3	Europe			
PACNET	Asia			
AT&T	US			
TATA	India			
Telstra	Australia			
BT	Europe			
Colt	UK, France			
PCCW			131 Countries, 1500 cities	London, Ashburn and Singapore
C&W	US, Europe			London
TCL		300 locations, 200 cities across 6 continents.		

(Note: Feedback was not received from MTN Business at time of going to press)

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SERVICE PROVIDERS

Classes of Service

Classes of Service	Internet Solutions		Neotel		Vodacom	
	Service Class Name	Service Class Description/Uses	Service Class Name	Service Class Description/Uses	Service Class Name	Service Class Description/Uses
Class 1	Voice	Voice class traffic	COS1	Real time traffic including voice (SIP) and video (telepresence)	Real Time – Voice	VoIP, Voice traffic, and Call Signaling
Class 2	Video	Video class traffic	COS2	Priority data (eg SAP) and video streaming	Real Time – Video	Video Applications, Interactive Video and Video Conferencing
Class 3	VVCC	Signalling	COS3	Transactional data and low priority video streaming	Interactive Data	Interactive business applications, such as Remote Desktop applications, ERP, SAP and Oracle.
Class 4	Platinum	Low-latency Data	COS4	Best effort	Business Data	Critical Business applications
Class 5	Gold	Data	NA	NA	Standard Data	Best-effort applications such as Internet, Webmail, and FTP
Class 6	Silver	Best effort	NA	NA	NA	NA

(Note: Feedback was not received from MTN Business and Telkom at time of going to press)

	Internet Solutions	Neotel	Vodacom
Traffic policing: Do you do any policing of traffic at the customer edge (CE)? Is QoS applied end-to-end (from PE to CE) or only on PE?	QoS is applied from CE – CE as an end-to-end solution	The QoS policies are implemented and enforced on the Building Switch (Layer 2) and also policed on the PE (Layer 3) in the Neotel MPLS network, locally and abroad. However, in Africa, we use TDM links for last mile hence the QoS is only applied on the PE. If Neotel is required to supply and manage a router at the customer site, the customer can then purchase a Managed CPE solution, where Neotel will then be in a position to do policing of traffic at the site.	Traffic policing is applied end-to-end. This is only enforced on Real Time classes to restrict bursting to lower classes.
Bursting Between Classes: Do you allow bursting between classes of services (up or down)?	Yes, up or down excluding Voice CoS. All other CoS may burst into Voice	The Neotel MPLS Network does support inter-class bursting with priority markdown. This does not apply to traffic in COS1. Excess traffic of the other classes of services will be marked down in priority and transmitted if there is available capacity within the bandwidth purchased by the customer.	Bursting is only permitted on the lower data classes, i.e. Interactive, Business and Standard Data classes.
Bandwidth Allocation Rules: Do you have any bandwidth allocation rules regarding the classes of services (maximum % of access that can be allocated to a specific CoS)?	None	Neotel allows customers to customise their COS breakdown for the services purchased; as long as it conforms to the 4 Class of Service Levels on the Neotel Network. The only limitation is regarding the amount of bandwidth. Bandwidths above 2Mbps will be in 1Mbps increments. Sub-Rate bandwidth below 2Mbps are available, but will be discussed on a case-by-case basis as this is subject to feasibility.	Vodacom Business does not apply any bandwidth allocation rules. We however do make recommendations to customers on the appropriate proportions particularly with regards to the voice not being allocated a relatively larger percentage of the line, relative to the lower data classes.

(Note: Feedback was not received from MTN Business and Telkom at time of going to press)

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SERVICE
PROVIDERS

Service Charges

	Internet Solutions		Neotel			Vodacom	
	South Africa (Y/N)	Rest of Africa (Y/N)	South Africa (Y/N)	Rest of Africa (Y/N)	Comments	South Africa (Y/N)	Rest of Africa (Y/N)
Access circuit charge	✓	✓	✓	✓	Prices may vary dramatically depending on the country.	✓	✓
Port fees / Bandwidth fee / CoS	✓	✓	✓	✓	Prices will vary depending on the location of the nearest POP, though it is expected that the variance will be less than that experienced with the access circuits.	✓	✓
CPE rental	✓	✓	✓	✓	CPE rental and management is available, depending on the country. The once-off purchase price will be the same for all countries, but the shipping and taxes will vary.	✓	✓
Network management (per CPE device)	✓	✓	✓	✓	Price variance for management will be minimal, depending on what the management includes.	✓	✓

(Note: Feedback was not received from MTN Business and Telkom at time of going to press)

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SERVICE
PROVIDERS

Network and Application Management

	Neotel	**Vodacom**
Network Management: Products, tools or services for network management	Neotel provides management of the end-to-end service across the world, assuming the customer has Neotel's managed CPE offering.	Network and Application Management on the VPN is currently provided through InfoVista and Netcool systems. At a service level InfoVista is used to provide both the Standard reporting and Advanced reporting. These tools enable the customer to provide basic utilisation reports for each class of service, and granular reporting based on Netflow statistics respectively.
WAN Optimisation: WAN optimisation products, tools or services		Vodacom Business currently does have a productised WAN optimisations solution. This is currently offered as a bespoke solution where our customers have a requirement.
Application Performance Management: Application Performance Management (APM) products, tools or services		Not Applicable

(Note: Feedback was not received from MTN Business, Telkom and Internet Solutions at time of going to press)

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MANAGING YOUR VPN STRATEGY

Nebula proposes key elements to managing your VPN WAN strategy. These areas are designed to address the full life-cycle of managing your VPN. The following can be used as a guide:

- Knowing your business strategy and objectives
- Providing the services required by the business
- Optimising the performance of those services
- Managing the risks and security of the service
- Transitioning to new technologies or services providers to meet changing business demands
- Maintaining the user, services, assets, usage, performance and costs baseline

Some suggested areas that need to be considered throughout this process include the following:

Aligning to Business Strategy
Aligning the VPN growth plan with the business' expansion into new territories and market segments
Forecasting the changes to applications and services to be offered over the network
Anticipating the changes to real-time performance requirements in the business
Understanding the changes to business processes and the centralisation or decentralisation of business functions
Understanding the dependencies on related business, application and infrastructure projects
Aligning the services and service provider to the business' risk and security demands
Defining the business case for transition or changes in conjunction with business

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MANAGING YOUR VPN STRATEGY

Enabling the Business
Knowing and managing your user and site profiles in terms of bandwidth, performance, services and continuity requirements
Understanding and managing the services and related performance requirements by user and / or site profile, including service coverage, availability, service request resolution, service classes and latency
Establishing and managing the required architecture and equipment configuration standards
Defining and managing the required hardware and software maintenance requirements
Defining and managing the internal and external compliance, security and performance standards
Determining and managing the required monitoring and reporting interfaces
Defining and managing the internal and external roles and responsibilities for planning, implementation, management and optimisation
Forward planning and managing the site and environment changes with consideration for lead times
Assessing and managing the current and forecasted business demand and forecasting the impact of costs on the various business divisions and on centralised management
Assessing and managing the business impact and risk of transition

Optimising the Performance and Costs
Managing user / site demand for services and consumption of services
Deploying WAN optimisation strategies to improve the efficiency of traffic over the network and the bandwidth consumption
Managing all infrastructure to align with performance requirements and ensuring the elimination or cancellation of redundant services or infrastructure
Monitoring and managing internal usage and service provider billing, and addressing anomalies on internal usage and consumption and external pricing and billing
Benchmarking the performance and costs of the VPN services and related value-added and management services
Utilising application performance management to align network resources with application requirements

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MANAGING YOUR VPN STRATEGY

Managing the Risks
Understanding the risks that may be inherent in the service or the service provider
Profiling and managing risks relating to significant changes in the demand for the volumes and types of services and the flexibility within the service and service provider to address these demand changes
Reviewing the stability of the service provider and its adherence to risk, security and performance controls and related audit and service management standards
Reviewing the key risk areas and associated controls over financial risks, operational risks, security, reputational risks, contractual risks and transition risks

Managing Transition
Ensuring mutual commitment from management and staff of both the enterprise and service provider
Conducting adequate project planning and implementing project management, governance and reporting structure
Minimising the likelihood of business or service interruption
Managing the Proof of Concept (PoC), service transition and the ability to enforce early termination or penalties
Overseeing the alignment within processes and teams across internal divisions, service providers and sub-contractors
Monitoring the transition impact on users, service performance, service availability, infrastructure and costs

Managing the Baseline
Maintaining a detailed profile of users / sites, standardised site profiles, infrastructure, consumption, performance and costs

ENABLING YOUR VPN STRATEGY

VPN FEASIBILITY AND BUSINESS ENABLEMENT

For reviewing or renewing your network service providers and technology, Nebula proposes a structured methodology and approach which is independent of both internal or external vested interests and that aligns with your investment, sourcing and governance requirements.

The Technology Business Enablement (TBE®) lifecycle is a structured methodology to enhance and protect your VPN decision support process:

Telecoms Business Enablement® (TBE®)

Nebula offers a Telecoms Business Enablement® methodology, which covers the structured selection, planning and implementation of telecoms services or products from a vendor or service provider. It can originate as part of a Telecoms Optimisation Programme® (TOP®) or Telecoms Strategic Decision Framework® (TSDF®) Project, as a result of the recommendations of either, or as a standalone engagement.

Secondly, TBE® entails the development and customisation of the best-fit operating model needed to manage and support the new services and business function within the client's telecoms environment (a choice between managed services, business process outsourcing, traditional outsourcing or a hybrid model).

The Nebula TBE® methodology follows a six-phased approach:

Phase 1: Feasibility analysis and approvals

During this phase, the case for change in the client's telecoms environment is examined, along with its impact and the organisation's buy-in and readiness. Nebula supports the executive in its approval of the proposal and helps prepare the proposal.

Phase 2: Sourcing and selection

Once approval is obtained, Nebula oversees facilitates a period of insourcing or outsourcing, as well as a service provider evaluation and selection.

Phase 3: Planning and preparation

Once approval has been received to proceed with vendor appointment and contracting, planning and preparation for the client's transitioning to and operationalisation of the new operating model follows.

Phase 4: Transitioning and implementation

This phase will facilitate full transitioning from the current state operational environment and solution to the new one, including

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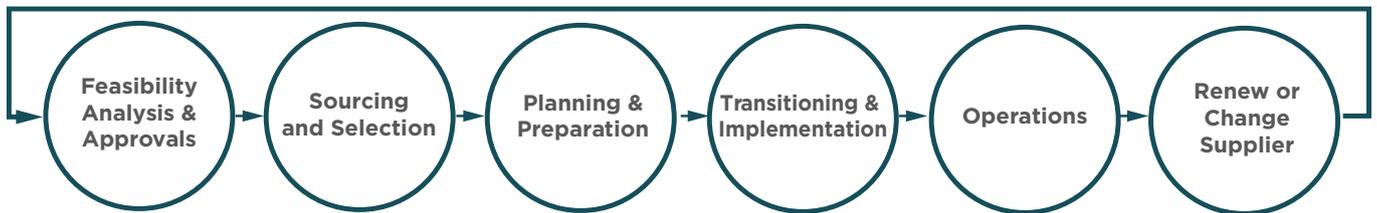
ENABLING YOUR VPN STRATEGY

training, implementation and migration management, change management and compliance management.

Phase 5: Operations

Once implementation is concluded successfully, the telecoms environment's successful on-going operations are ensured through a variety of measures, including service and performance assurance, configuration and migration data management and best practice controlled handover.

Phase 6: Renew or change supplier

With continuous refreshing of the Telecoms Baseline Profile®, the latest information in terms of in-scope services will, at contract maturity, lead to a decision whether to renew a contract or not. If not, the entire TBE® methodology will need to be restarted. If renewal is in order, Nebula's Contracting Consulting function will be engaged.

| Feasibility Analysis & Approvals | Sourcing and Selection | Planning & Preparation | Transitioning & Implementation | Operations | Renew or Change Supplier |

Nebula's Techonology Business Enablement® (TBE) Lifecycle

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nebula®

STRATEGICALLY CREATING
BUSINESS SUCCESS

Nebula is an independent professional services firm that creates business success through its expertise and holistic service offering across the telecoms spectrum, specializing in enterprise telecoms outsourcing, consulting and insight. We offer end-to-end advice allowing our clients to get value out of their telecoms investments, providing them with solutions and helping to implement them.

Our engagement model is one of extensive and on-going interaction, resulting in a significant exchange of knowledge between our clients and us. This model enables us to create sustainable value for our clients, and thus guarantee their business success.

Nebula operates independently of products or service providers with a team of highly skilled technology and business professionals, handpicked to deliver comprehensive strategic solutions for our clients that follow focused principles and methodologies.

Please contact us if you would like to discuss technology strategy, investment or optimisation decisions and would like an independent party to assist you with those processes.

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