



Sri Lanka Telecom

Response to the Telecommunications Regulatory
Commission of Sri Lanka (TRCSL)

Public Consultation on Policy & Regulatory
Framework for Next Generation Networks (NGN)

29 November 2010



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Public Consultation on Policy & Regulatory Framework for Next Generation Networks (NGN)

1. The Consultation in Context

SLT is pleased to offer its comments on TRCSL's consultation. It is important, when contemplating change to a regulatory regime, to consider the strategic national interest and to strike the optimum balance with industry specific concerns. We believe that the objective of any regulatory structure should be to ensure that the national interest of fostering progressive development and roll out of technology and services is complementary with industry economic and technical reality and a rational optimization of available resources.

The first section of our response relates to the current status of competition and infrastructure, the role communications needs to play in supporting economic development, and the role regulation could play. We identify a major opportunity for the country, and propose a way forward. We show how, by acting in concert, we can bring broadband to everyone in Sri Lanka. The objective of delivering broadband access to every Sri Lankan resonates powerfully with both the national interest and those of the industry.

The second section of our response provides comments on the detailed questions TRCSL raises. An annex sets out some more detailed technical matters.

1.1. Introduction and summary

Communications are the backbone of the economy and a vital factor in supporting accelerated development and the transformation of Sri Lanka into a wired society integrated seamlessly into the global information web. TRCSL's consultation request is far ranging. The conclusions reached and the decisions made as a result will shape the Sri Lanka communications marketplace and national outcomes for many years to come.

For these reasons it is important that we begin with an assessment of the nation's present communications infrastructure. We demonstrate how and why Sri Lanka's infrastructure differs from that of the western economies, and why as a result their regulatory models are not always right for us. We consider what changes are needed if our industry is to support a bold national ambition, future economic prosperity, and broadband communications services for every Sri Lankan.

Sri Lanka needs ubiquitous and affordable broadband operating at speeds supporting a wide range of services and applications. While there are significant barriers to realising that ambition, they can be overcome. SLT has the expertise, capability and willingness to utilize its significant network resources to achieve these objectives.

We then consider how regulation can help - or hinder - the necessary evolution of the nation's communications infrastructure.

We conclude that regulation needs to refocus its energy. The priority is no longer promoting ever more intense competition for the more affluent customer, or for those in specific geographic areas, but in encouraging networks to invest, extend their reach, and deliver enhanced services to a broader community.

That requires regulation encouraging operators to integrate networks and make their operations more efficient. It requires regulation avoiding additional and costly burdens, replicating systems, or placing more obligations on some or all of those who invest in infrastructure compared with those who do not. If new wholesale services are required they should be forward looking and support network evolution.

An ambition to bring broadband to the nation calls for a shared vision, delivered in partnership between government, regulation and the industry. Government sets the vision. The industry has the prime role in delivering infrastructure, with regulators building a framework to promote and support investment, competition and consumer protection. It is a multi-year vision which requires clarity of vision, consistency of direction and commitment if the required outcomes are to be achieved. SLT is ready to play its part in shaping and delivering this vision.

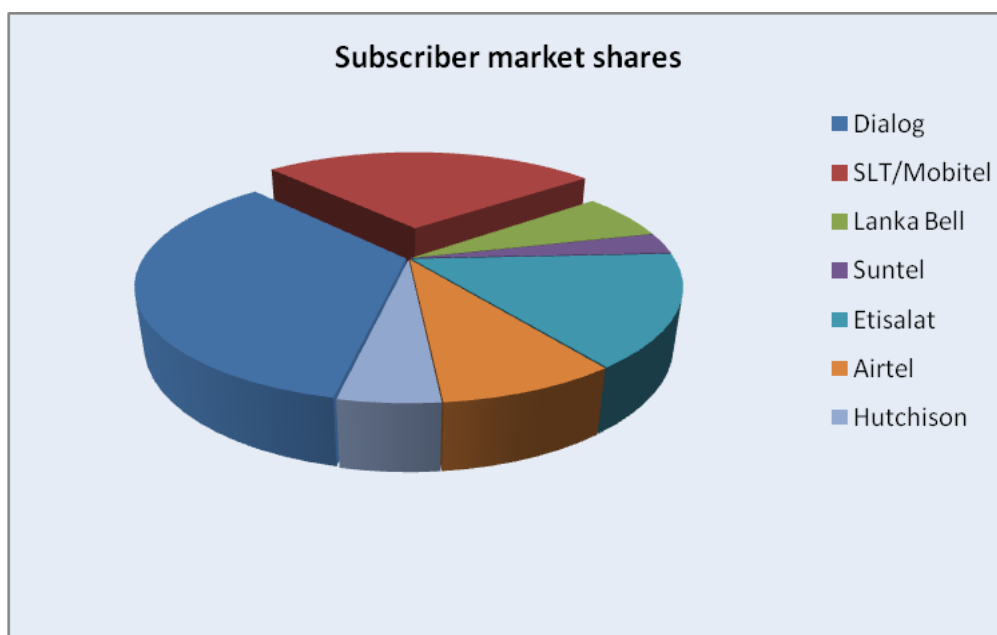
Public funding may have a part to play in bridging the gap between what the industry can deliver on commercial grounds and what the Government determines society and the economy requires. Care needs to be exercised to ensure public investment supplements and extends, rather than duplicates, private sector network build.

This consultation comes at an important time in the nation's history. The nation needs competitive communications to play a key role in supporting national ambition. It is time to align the actions of regulation, the industry and the Government behind a shared vision, and together revolutionise the quality and availability of our national communications services, driving accelerated economic progress over the next six years.

1.2. The Telecommunications Market Today

Competition in communications has been part of our landscape since 1989, overseen by regulation since 1991. The industry has been transformed. Since 1999 the number of subscribers has grown at a compound growth rate of 34%. In 2010 Sri Lanka is likely to reach 20 million fixed and mobile subscribers.

Nineteen years of regulation have seen competition to SLT grow rapidly. The market now has multiple players of scale, and a distribution of market shares confirming robust competition. Price competition is now so fierce that regulation has been obliged to set minimum prices to avoid destructive price wars. The chart below shows SLT's estimation of current subscriber (fixed and mobile) market shares.



SLT believes that regulation has succeeded in introducing, developing and promoting competition. That phase of its work is now complete, and it is time for regulation to begin withdrawing from interventions designed to promote competition or control market power. The focus now needs to be on encouraging investment in new technologies and the extension of services into rural communities and strategically significant locations.

NGN is only part of the picture. An NGN allows a single network to carry traffic from many services very efficiently. But for customers to use those services and to benefit from an NGN they need to connect to it using an access network which will support the services they need. The end customer connection is currently the limiting factor and a major cost, and needs careful consideration.

For future services that connection must be broadband. Mobile services are broadband capable and continue to improve their capabilities. But there are challenges when it comes to fixed access. CDMA has no natural upgrade path to high speed broadband. There are current limitations on what existing copper networks can deliver, arising from Sri Lanka's geography and history, but with appropriate treatment from SLT (already underway) these copper networks can become part of an integrated approach for delivering world class broadband.

Sri Lanka has a predominantly rural population: 15% of our people live in urban areas and 85% in regional and rural. This means that the cost of connecting people to the telephone network using conventional copper is particularly high. As a result copper lines form only 25% of all fixed connections. The bulk of fixed access connections use CDMA wireless which has no current broadband ability and only limited prospects of further evolution. Sri Lanka has vastly fewer copper access lines than most western economies.

Because of the rural nature of the economy the copper access we have is dispersed and has very long line lengths. The length of a line has a direct and fundamental impact on its ability to carry broadband, and on the broadband speed that can be provided. The longer the line, the less suited it is to broadband. For example, in the UK

some 96-98% of telephone lines are able to deliver basic (from 512 Kbps upwards) broadband. In Sri Lanka the total is smaller, at around 75%, although these figures will be vastly improved as SLT's plans for reconfiguring the copper network are implemented.

512 Kbps is a basic entry level for broadband. It is not an adequate foundation for a future broadband enabled Sri Lanka. For example, only 54% of lines will support standard definition IPTV at a basic 3Mbps. The future will require even higher rates to support multiple simultaneous services in a single premise, and so providing pervasive service at 10+ Mbps. should be regarded as a minimum

Sri Lanka has far fewer copper lines, covering a much smaller proportion of the population than most western economies. Without substantial change those lines are not well suited to future broadband needs.

In this review we have established that:

- Competition is flourishing, providing consumers with keen prices and a choice of providers, packages and technologies.
- Regulation has achieved its goal in promoting entry and securing customer choice.
- Sri Lanka's geography and population distribution has led to a radically different network nature and structure than is found in more urban centred national markets.
- As a result a different regulatory approach to those adopted in western economies is required
- There are serious barriers to be overcome if fixed broadband is to deliver the performance a competitive economy will require.

1.3. What Will Sri Lanka Need from Its Telecommunications Infrastructure?

The future is all about broadband. SLT has doubled its broadband customers in a year and the country is on track to reach a million users by 2012. But progress is also accelerating elsewhere. Major investments are underway across the globe to bring much higher speeds to as many consumers and businesses as possible. IDATE, a European consultancy monitoring high speed broadband, reports that at the end of 2009 there were some 60 million high speed broadband¹ customers across the globe, with Asia and Eastern Europe leading the pace.

By 2014 IDATE forecast that there will be some 306 million homes passed by high speed broadband, worldwide half of them in Asia.

¹ From IDATE, FTTH 2010 Markets and Trends, Facts and Figures. Based on extended access fibre either directly to the premise or to a VDSL or LAN connection serving the premise

It is no coincidence that it is the emerging economies of the world that are at the forefront of this evolution. These economies see that the future lies in connected societies accessing, transacting, and sharing data and services through high-speed networks. Businesses of the future will reach and serve their customers over such networks, will run their operations using distributed programs via 'cloud computing systems' and utilize staff connected virtually, and will develop services and applications exploiting the capability of networks and the power of connected communities.

South Korea expects to double GDP through the use of high speed broadband. Japan expects to add 1 -1.1% to GDP growth rates and China 2.5%, directly from the benefits high speed broadband will bring.

Sri Lanka cannot afford to be left behind, if it is to develop as a nation. .

SLT has a broadband vision.

Our aim is to see all Sri Lankans seamlessly connected to World Class Information, Communications and Entertainment Services. Our target is to deliver 90% of our wired customers able to access bandwidths of 20Mbps+ and to integrate this with future wireless access technologies into a national fabric, enabling customers to access and enjoy the full range of services broadband will provide.

Getting there requires a concerted effort, from the industry, regulator, and Government. SLT can extend its network deeper into rural areas, if it reduces its cost. That means being allowed to combine platforms and transmission capacities to maximise economies of scale and scope. This is a primary aim of Next Generation Networks: one efficient platform supporting multiple services.

The proposed National Backbone Network (NBN) could form part of this picture.

We do not have to start from a clean sheet. There has been considerable investment made and progress achieved by SLT. Our network already reaches 78 of the 80 nodes the NBN seeks to cover. If NBN capabilities were delivered through and as part of our integrated NGN network, the benefits and wholesale services would be available much faster and more cost effectively. The single integrated network would also help reduce costs and support reach deeper into rural areas.

On the other hand, as a stand-alone entity a new and separate NBN would compete for traffic with the networks built by private companies, undermine their investments, needlessly duplicate existing infrastructure, reduce network loading and increase unit costs.

Extending the NGN core network is only part of the picture. SLT also needs to invest in a variety of fixed access technologies to overcome the limitations described earlier. For copper networks this means extending fibre closer to our customers, enabling very much higher bandwidths to be provided over the resulting shorter copper links. For current CDMA customers this means a mix of solutions, using Wi-max, sub GSM 900 band and 700 MHz frequencies, or copper uplift.

SLT is developing a major programme to bring these far reaching improvements together under a single programme, "i-Sri Lanka", driven by the overall vision of broadband for everyone and 90% of fixed wired customers able to get high speed

broadband of 20Mb/sec plus. To do all this SLT needs to be free to bring its networks together and to rationalise and optimize their structures. It needs access to appropriate spectrum to cover the largest possible number of locations. It needs a forward looking regulatory environment focussed on enabling progress, not on further levels of intervention, or on promoting “cream skimming” selective pockets of established demand.

And in so doing, SLT can deliver an enhanced platform for ongoing competition and deliver on the national vision.

1.4. Implications for Regulation

Sri Lanka lags behind its global competitors and peers in fixed broadband deployment, and they are moving ahead fast. Catching up and keeping pace needs much more than business as usual. It calls for significant investment, both public and private.

Private investment needs confidence that regulation will be consistent, even-handed and fair; and will allow those who risk capital to build infrastructure to benefit from their investments. That means allowing competition, rather than regulation, to determine outcomes and letting commercial negotiations, not regulatory intervention, govern access to NGN networks from service providers who do not contribute to their costs.

Public investment, or a future universal service fund, needs to focus on areas the private market cannot commercially address, and to avoid duplication of private sector assets and dilution of their value. SLT has already invested LKR2.5Bn in upgrading its network, building a capability already covering 78 of the 80 nodes the NBN is intended to reach. To the extent public investment may required, it should concentrate on access networks, ensuring the full benefits of broadband and NGNs are readily available to customers wherever they are.

Sri Lanka needs SLT - and its infrastructure competitors - to be free to integrate their network platforms, rationalise their structures and extend their fibre network reach. Barriers to access network evolution, such as access to spectrum need to be lifted in a technology neutral way, leaving the market to develop the right solutions.

SLT recognises that wholesale access obligations are important, but the form they take needs careful assessment. They need to be provided from forward looking network capabilities and architectures, so they support migration to an NGN. Competition will benefit from wholesale access services that are forward compatible with an evolving fixed access network.

SLT needs to be free to upgrade its access network with extended fibre, and to rationalise and optimize the underlying network structure, if we are to move quickly towards the infrastructure the nation needs.

Wholesale customers are an important market for SLT. We are already an active provider of network and infrastructure services to competitors, with a wholesale income of LKR 2.7Bn from growing at 25% per annum. We recognise and support the need to provide wholesale access to broadband competitors. We are ready to engage with TRCSL and the industry to define forward looking services which will support competition through and beyond our access and NGN network upgrades, and which, crucially, do not stop or impair us in rationalising the network and improving access broadband.

There are other positive contributions regulation can make.

- Access to 700-900 MHz spectrum will be an important element in delivering universal broadband across the nation.
- A licensing regime which specifically rewards investment and does not handicap infrastructure players when competing as and against service providers would signal recognition of the need to support those building for Sri Lanka's future.
- Recognition that the present market is highly competitive and free of dominance and market power would remove the threat hanging over larger players of selective disadvantage and costly additional obligations.
- Bridging the gap between commercial broadband build and the 100% availability target will need regulatory help. The problem is not simply one of network build. It also entails power to premises, access to computers and affordability.
- Regulatory support for cross industry working on NGN interconnection, interoperability, standards, network protection, security and migrations would be very constructive. Overly rigid insistence on sustaining all form of legacy service unchanged through the transition to NGNs, on the other hand, would not.
- A more determined stance from TRCSL on consumer protection – with measures embracing all customers rather than those of some operators only, and dealing with slamming and other forms of abuse, would help ensure that the changes we need as a nation are fairly undertaken and do not result in customer abuse or detriment.

The ultimate outcome from this TRCSL consultation has the potential to lay the foundation for a revolution in broadband availability and use throughout Sri Lanka. It will support an economic renaissance and the elevation of our economy to the ranks of the regional and global giants. The alternative, of intrusive regulation hostile to investment, would chill and frustrate ambition and leave the nation without the facilities and investment it needs.

In the following sections we respond to the specifics of the consultation. But we urge readers to consider first the overall picture set out in this introduction. Answers to individual consultation questions cannot sum to the broader vision we consider so important.

SLT's Broadband Vision

Our aim is to see all Sri Lankans seamlessly connected to World Class Information, Communications and Entertainment Services. Our target is to deliver 90% of our wired customers able to access bandwidths of 20Mbps+ and to integrate this with future wireless access technologies into a national fabric, enabling customers to access and enjoy the full range of services broadband will provide.

..... 29 November 2010

Greg Young, Chief Executive Officer, Sri Lanka Telecom plc

Answers to Consultation Questions

2. Introduction to NGN

SLT Observation

An NGN is a packet switched network operating from the first point at which signals from a variety of access networks are processed and managed. NGNs replace the traditional architecture of TDM based backhaul and core networks structured around local and trunk telephone exchanges, or mobile network switching centres and their interconnecting networks. At one level, an NGN is simply the natural evolution of a network's architecture and topology. SLT is already significantly advanced in NGN deployment for delivery of both voice and data services.

Access networks feed traffic onto NGNs and take NGN traffic to customers. They can be fixed copper, Wi-Max, Wi-Fi, CDMA, cellular handsets, ADSL, VDSL, Ethernet, fibre or any other technology capable of collecting an input from an end-user and transmitting it in a suitable form to the NGN. Where the access network has been upgraded to provide future proof broadband services it is called an NGA –Next Generation Access.

This distinction between access networks and the transport network they link to becomes important when considering Universal Service, which is primarily an access network issue, and broadband, where the issues to be overcome are primarily access rather than NGN matters.

Question 1: Do you think that you or your company could benefit from the services that will be made possible by the implementation of NGN networks? If yes, please explain by means of examples.

SLT is already convinced of the benefits of NGNs and is well advanced on a substantial investment in new Sri Lankan infrastructure. Over LKR 2.5Bn has already been spent by SLT on upgrading our fibre network and installing NGN plant. 26% of our NGN deployment is already complete.

NGN benefits SLT in two ways. The transport layer is service agnostic, and provided we are free to integrate multiple services on a single NGN transport platform, will represent a more efficient and future proof investment. Second, NGNs support a wide range of services based on voice, data and all forms of media and so encourage service creation, both by the NGN network operator and by others providing services utilising the NGN's capabilities.

At this stage it is too early to speculate on the full array of services NGNs might carry. But we expect them to include fixed and mobile originated voice traffic, data services including internet access and IPTV, and myriad forms of file/data transfer.

SLT also sees its NGN as the basis for a world class set of wholesale offerings.

Question 2: Do you think that the incentives available in the private sector for operators to begin to migrate to NGN are sufficient to promote adoption, or do you believe that the broader social benefits warrant additional steps being taken by the government to promote this migration? If so, what steps would you recommend the TRCSL investigate to promote such migration?

It is evident from SLT's own investment that there is a sound commercial case for NGN adoption. Others are also well advanced in their NGN build. The market is already in transition to NGN structures. For these reasons we believe it best for the regulator to continue to let the market determine the rates of build and migration.

We support a regulatory stance positively encouraging investment. If new incentives specific to NGNs are introduced they should treat fairly those who have already committed significant funds.

There is also a positive role for regulators to play in easing the transition to NGNs by clearing roadblocks. Regulatory support for customer migration between platforms and services; regulatory acceptance of the consequences of withdrawing legacy platforms, and regulatory support for an industry group standards on NGN issues (see Questions 9-13 below) will all make it easier to build, operate and provide service over NGNs.

There is a further and important regulatory role. Today, operators and the services they provide are intimately linked. In this environment regulatory objectives relating to services can be achieved through regulation of operators. In an NGN world things are very different. Operators provide connectivity and may also provide service, but so will many others.

Regulators need to set out clearly what role they intend to take in respect of services and those who provide them, and to set out how consumer protection is to be achieved when services are provided by agencies new to the regulatory terms of the traditional communications market.

SLT also considers that regulators should track and report progress in building NGNs and the migration of services and customers onto them.

It is however important that regulation actively refrains from deterring NGN investment, inadvertently or by design. Imposing conditions on infrastructure investors (whether collectively or selectively) which restrict their ability to compete at the service level, limits the return they can make, hampers their ability to integrate platforms or opens access to their service layer in ways they would not adopt commercially would all serve to increase the risk of investment.

Question 3: Do you foresee any negative consequences of the migration to NGN for the telecoms sector or broader society? If so, please describe them, along with any steps that the TRCSL could investigate to mitigate or avoid those consequences.

Any transition may give rise to some frictional cost or inconvenience, but SLT will work to ensure these are minimised, and believes that to the extent they do occur, they will be minimal in comparison to the gains to the sector, its customers and to society generally.

For example for some customers the legacy service and its NGN successor may differ slightly from one another in ways not always easy to predict in advance. Some forms

of existing customer equipment may not retain full functionality when connected to an NGN.

In other marketplaces there have been problems with alarm services and with leased lines as NGNs have been deployed. If VoIP services come to substitute for conventional fixed voice steps may need to be taken to preserve customer access to emergency services

These are issues all those building NGNs will face. We will support cross industry dialogues working to identify and resolve such issues on a shared basis, and encourage TRCSL to bring interested parties together in a suitable forum. Overall, it is clear that the benefits of the migration to NGN will far outweigh any relatively minor inconveniences as a result of the transition.

3. Technical Issues

SLT Observations

To place our answers to the consultations questions in context SLT offers at Annex 1, our view on the principles and requirements for a Next Generation Network (NGN) and a statement on the progress SLT has made so far in developing its NGN.

As we observed in our earlier comments, SLT distinguishes between access networks and NGN networks. Our access improvement proposals are described in the introduction to this consultation

SLT believes there is a strong alignment between the description of NGN; as provided by TRCSL in the consultation, and both the current and planned realisation of the SLT NGN as defined under the SLT NGN Transformation programme.

Question 4: Do you see any issues or opportunities relating to access to, and use of spectrum now? Will issues and opportunities potentially emerge from telecommunications and broadcast convergence?

As we described in our introduction, there are issues with extending the capability and reach of the fixed access network.

Radio technologies are therefore going to be critical in extending the benefits of broadband to currently unserved rural households. Spectrum for LTE would support mobile broadband.

SLT believes that allocation of sub GSM 900 band radio will be essential. It will be a component of the most appropriate and effective solution to meet Sri Lanka's wireless access network development. The sub GSM 900 band should be preferentially available as part of a deep national roll-out, and not used for "cherry-picking".

SLT would urge TRCSL to develop industry wide consensus on the need for spectrum to be re-farmed and apportioned to facilities and infrastructure providers. Convergence offers new opportunities for better use of the relevant frequencies

In the longer term SLT would support the objective of learning from the EU Directive on clearing the 790 - 862 MHz sub-band for Broadband Wireless Access. Not only would this significantly augment the delivery capability of Access Networks for Broadband within Sri Lanka, there will also be a significant economic benefit in terms of costs for service provider platforms and consumer CPE.

Question 5: Do you believe that innovative voice services such as Skype and Google represent a threat or an opportunity for the Sri Lankan telecoms market? What are the roadblocks to realising benefits from such services?

Services such as Skype and Google are instances of closed proprietary implementations of VoIP. They are not dependent on Next Generation Networks, and can operate in any environment where there is reasonable access to the internet. Such services increase the choice available to customers and in that sense they are an

opportunity. They also increase competitive pressure on other players in the market, spurring price and service innovation. SLT's VoIP capability is already available and in use by customers. Unlike Skype and Google it is based on non-proprietary standards. The greatest benefit to the market will come from the use of open and non-proprietary VoIP services.

Consumer protection measures applying to conventional voice services should apply equally to innovative voice services under NGN. By that stage new VoIP products will be substituting for conventional voice services and consumers opting to move from one form of voice technology to another competing with it should not be at risk of losing protection or, for example, access to emergency services.

As posed, the question assumes the existence of "road-blocks". SLT is not convinced that unreasonable barriers exist, and would welcome the opportunity to comment on views expressed to TRCSL to the contrary.

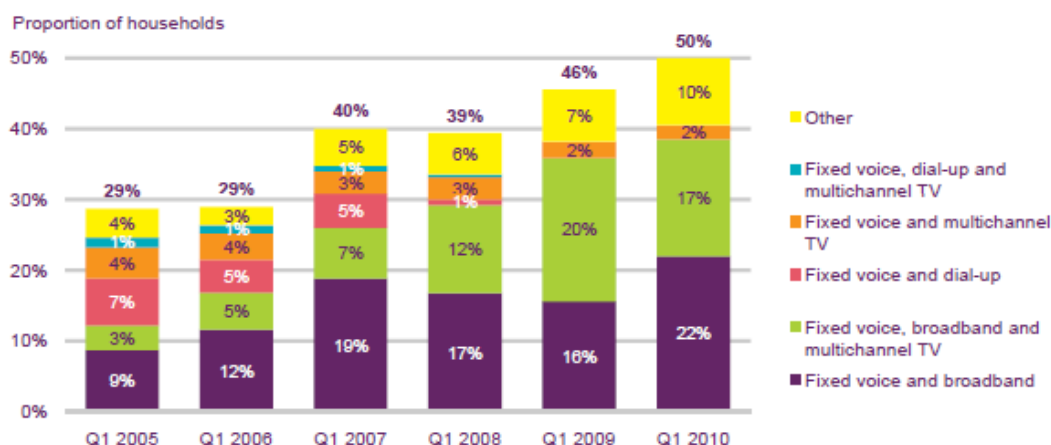
SLT notes that the arrival of significant levels of competition between VoIP and traditional voice services will give rise to a number of complex and novel policy issues. A TRCSL led cross industry group to examine and report on these matters would be helpful.

Question 6: Do you believe that the range of TV content available is an important or primary basis for customers' decision to purchase telecoms services? Do you believe that a merger between the media regulator and the TRCSL would provide an environment which promotes competition and increases user choice?

The evidence from other markets is that customers welcome bundled services and that TV content is an important driver of supplier selection. Broadband roll out effectively supports IPTV growth as well as the provision of other services.

The table below shows the take-up of various forms of bundle in the UK. Half of all households take some form of bundled service, and 19% take services including TV.

Take-up of bundled services over time



QG1. Do you receive more than one of these services as part of an overall deal or package from the same supplier?

Source: Ofcom technology tracker

Globally IPTV is proving highly popular. There are estimated to be 35 million customers already worldwide, a total growing fast. In China, ipTV news reports that IPTV customers will grow from 4.4 million in 2009 to 8.5 million this year and 31 million by 2013. In the United States IPTV is growing rapidly, and has reached 8% market share in just a few years,

A merger between regulators does not of itself promote competition or improve customer choice. That rests on the quality of the decisions combined or separated regulators make. But a merger can reduce the risk of overlapping or contradictory regulation, which can deter investment or inhibit innovation. In an NGN world, however, it is hard to see where a merger boundary could sensibly be drawn.

Question 7: Please describe your planned migration to NGN. (a) What is your technical strategy to migrate to NGN, if any? (b) What will be the key phases in your migration to NGN, and what phase are you currently in? (c) What is your anticipated timescale for each of these phases? What technical issues need to be resolved to allow you to offer the services you would like to be able to offer today, and over the next four years?

We are three years into our NGN migration plan. The first two phases are complete, with 26% of our customers successfully migrated. The bulk of our customer migration will be completed over the 3-5 years of the next three phases of our plan.

SLT has also migrated the following additional services onto the NGN core transport network:

- Backhaul for xDSL broadband services,
- Backhaul for operator circuits
- Layer 3 IP VPN and Layer 2 Ethernet VPN services,
- Connectivity for a hosted business IP telephony service

SLT is in the process of developing legacy service migration programmes for consumer, business and wholesale products that are currently supported by TDM platforms. It is the intention of these programmes to migrate where possible, all services and products onto the NGN transport network and retire the legacy network platforms.

These programmes are developed within the SLT NGN transformation programme, which is dependent on the TDM replacement programme to implement the necessary transport infrastructure (Service Edge Metro Nodes) and Next Generation Access Nodes.

Our answer to question 3 covers our concerns on technical matters.

For further details on our migration please see Annex 1.

Question 8: What is the impact of NGN on existing telecommunications networks and services revenues, in light of the overall benefit that may be derived from the introduction of NGN? Do you think the TRCSL should play an active role in the migration to NGN? If yes, what measures should the TRCSL take during the migration and in the course of the long-term adoption of NGN technologies and services?

There are two distinct questions here.

First, the impact of NGN on existing telecommunications networks and services revenues. NGNs are the evolution of existing networks and so will subsume their revenue streams.

The impact on existing service revenues is unpredictable: these are competitive markets and their evolutionary trajectory will be shaped by how well individual network and service providers identify services which are valued by customers and delivered to them efficiently and effectively. It is likely but not certain that the mix of services generating revenues will change, potentially quite radically. Conventional sources of income may well decline; new sources and applications will arise.

Implicit in a move to NGNs is an eventual shift from recovering costs through a combination of access and call charges to an alternative model better reflecting the link between capacity used and costs. This is still very uncertain territory where commercial and regulatory models remain unclear.

In such an unpredictable world it is very important that returns to those investing in networks are not further endangered by regulatory uncertainty or the imposition of additional or asymmetric burdens. That would deter investment in building and developing NGNs.

Second, the role of TRCSL. SLT believes there is a valuable role for TRCSL in constructing a regulatory regime which recognises and values network investment; which facilitates customer and service migration; accepts the withdrawal of legacy services and platforms; and fosters cross industry standards and interface development. Such policy must be evolutionary: it is not desirable that regulation seek to over-define or constrain possibilities.

Question 9: What are your preferred protocols, architecture and interfaces for inter-connection with the PSTN, other NGNs, and with international networks (voice and Internet)? Please describe in detail the associated timeframe for each of your choices, in relation to your overall migration roadmap described above.

SLT already provides interconnection between the SLT NGN that supports the transformed PSTN Service, and the remaining TDM platforms that support the legacy national and international PSTN services.

SLT also provides interconnection between the SLT NGN that supports the transformed PSTN Service and Other Licensed Operators (OLO) voice platforms.

SLT believes that there is a requirement for a standardised interconnect architecture for the interaction of Next Generation Networks within Sri Lanka. During migration from the current legacy environments to NGN, there will be a requirement for this Architecture to support a form of NGN multi service interconnect between SLT and other operators.

Additionally, a generic framework will need to be defined governing technical specifications for media, signalling, management, overload control, numbering, testing, performance and security. SLT will be active in promoting and developing this interconnect architecture within the Sri Lankan market.

SLT is currently developing a strategy for NGN interconnect, and is evaluating the UK NICC standards for multi-service interconnect (ND1611) as an option.

Our preference for protocols and interfaces is to opt for internationally recognised standards where possible. The protocols we use or plan to use are:

- For PSTN, PLMN: SS7, R2, SIGTRAN (SS7 over IP) M3UA, M2UA.

- With NGN Platforms/other IP networks:

 - Signaling: SIP/SIP-1/SIP-T

 - Media: RTP/RTCP

- With MGWs/AGWs H.248, MGCP (with IADs)

Question 10: Do you envisage any general issues in relation to NGN interconnect? In particular, do you envisage any issues in relation to current peering arrangements?

The SLT view of the requirements and context for NGN Interconnect is included in our Response to Question 9. To the extent that operators work to common standards and interfaces interconnection should prove relatively straightforward. Non-standard interconnection requirements may prove more difficult. SLT does not believe it should be obliged to continue to support legacy network interconnection indefinitely.

SLT would maintain the view that NGN interconnect and operator inter-connection at an IXP; for the purpose of exchanging internet traffic on a peering basis, are fundamentally different requirements; in respect of attributes such as performance, QoS and security, and therefore warrant different consideration and solutions.

SLT would support the view that the standards and procedures developed for governing “inter-operator connection for internet traffic peering” would be different to the standards and procedures developed for governing a NGN Interconnect.

Question 11: Please describe any experiences that your company has of an Internet exchange point in Sri Lanka or elsewhere. Do you foresee that your company will have an increased reliance on an IXP in the future, for Internet applications including voice? If so, are there any roadblocks to such usage in Sri Lanka today? If so, please describe those roadblocks and the means to overcome them.

SLT is a member of the LISPA-IX Internet Exchange Point. An IXP is a useful means of connecting multiple operators efficiently. It is not a substitute for privately reached peer to peer connections.

SLT would support an independent not for profit IXP for local internet traffic exchange, operating under standards and procedures created and policed by industry under a TRCSL framework and, where necessary, enforced by TRCSL.

SLT maintains the view that the IXP infrastructure will remain appropriate for Internet based traffic only. Where this traffic contains (non-PSTN) Voice Services then these will be subject to the “Best-Efforts” nature of traffic delivery over the Internet.

Question 12: Do you believe that the establishment of a national body to standardise interconnection between NGNs is required in Sri Lanka? If so, what do you think would be the best governance model for it?

Yes, if suitable terms of reference can be agreed.

Ideally an industry body is sponsored by the industry because individual players see and support the need. But competitive NGN telecommunications markets are relatively new, and there is an important catalytic role TRCSL can play in developing and sponsoring participation in a pan-industry body. The form that body takes should be such that the industry itself runs and operates it, or comes to do so in a relatively short time.

That means that the governance model is one of a body with a chair appointed in consultation with the industry and a small technical staff, governed through a board of industry representatives. TRCSL would also be represented. It needs formal terms of reference, with members agreeing to operate to the interfaces and interoperability parameters it agrees. There may be a need for a fall back for regulatory determination in the event that members are unable to agree on an issue.

SLT would be willing to play its role in the establishment and functioning of an industry body concerned with technical cross industry NGN issues, including standards, interconnection and migrations. Commercial matters should not be within its scope.

The regime referred to in the consultation, of two bodies, one concerned with network interfaces and one with NGN migration seems inefficient. SLT would prefer a single institution, with suitably wide scope.

Question 13: Do you believe that the TRCSL should mandate that operator should put in place equipment to monitor its network performance in terms of delay, jitter, packet loss and bit error rate for different classes of service?

SLT has already deployed performance and capacity management capability throughout its NGN and can monitor overall network performance.

SLT agrees with TRCSL that performance and quality of service are fundamental aspects of delivering services over Next Generation Networks. It is however, not so much a question of TRCSL mandating equipment, but one of the regulator setting out what monitoring outputs it requires across the industry, and then engaging in a dialogue as to what information represents a reasonable and achievable minimum level of standard reporting.

SLT supports industry wide reporting, combined with the provision for TRCSL to be able to audit the results, and ensure consistency of reporting across operators. SLT sees regulatory standards as a ‘safety net’ and expects it will work to higher standards driven by competition and technical evolution.

Question 14: Do you believe that other network performance parameters such as network availability should also be monitored by the TRCSL? Please use examples to illustrate your answer.

See our answer to question 13

Question 15: If you answered yes to the previous questions, do you believe that the national standardisation body should take responsibility for specifying what should be monitored?

SLT believes in this instance TRCSL should act on the basis of advice from the standardisation body, but that the decision is one for the regulator. In saying this, SLT believes that the customer in a competitive market is the ultimate arbiter of performance expectations and assessment of delivery. There are many examples of ornate technical measures which do not translate well to customer experience. SLT believes that any standards must be a minimal set and subject to a review process.

Question 16: What are your views on security in NGN networks? In your view does current technology, such as firewalls, provide adequate security to NGNs? Do you believe that there needs to be national NGN security policies and standards?

SLT believes that NGN Security is a highly complex and specialised area that could not be adequately supported if based on firewalls.

SLT fully supports the development, policing and enforcement of national NGN security policies and standards. SLT has developed a comprehensive strategy to govern security aspects of its Next Generation Network. The strategy evaluates industry standards, as well as threats and vulnerabilities within the context of a security domain.

The following have been identified as the different types of threats for the NGN security domains.

- Denial of Service (DoS): NGN network elements are overloaded by bombardment
- Eavesdropping: threatens confidentiality by intercepting communications
- Masquerade: use of false identity to misuse NGN resources
- Unauthorised access: unauthorised access to NGN network elements can disrupt operations
- Modification of information: deliberate manipulation and damage of data
- Repudiation: targeted users denied communication by denial of services. Can cause loss of trust and revenue

The Security Strategy for SLT NGN will be based on the TISPAN NGN standards.

Question 17: Please comment on the need for revisions to numbering plans for new services, and the need or otherwise for non-geographic codes recognizing increasing user nomadicity?

SLT recognises the need for revision to numbering plans to provide scope for service innovation and increased ease of use. There will be a range of practical issues to be addressed as specific changes are proposed and considered and further discussions will be required to ensure new number uses can be supported.

Our principle initial concern with regard to changes to geographic and non-geographic numbers is one of customer expectation. Numbers are linked to prices in customers' minds.

Question 18: How do you think the harmonisation of naming and numbering of different networks should be addressed? At what stage of your migration plan will the harmonisation of naming and numbering be required? Do you think a national standardisation authority (mentioned in Section 3.5.2) should be in charge of implementing the harmonisation of the naming and numbering across the country? Do you see a future need for international coordination for any or all of Sri Lanka's naming and numbering schemes?

Thinking on numbering and naming harmonisation is still at a relatively formative stage for SLT. We would favour of National Standards body identified earlier being chartered to develop requirements and solutions for naming and numbering harmonisation within Sri Lanka, and will support its work. Answers to some of TRCSL's more detailed questions will emerge from its work, rather than can readily be determined in advance.

SLT will be developing requirements for naming and numbering harmonisation during the review of our NGN service layer and control layer strategies.

Question 19: Do you see ENUM as a fundamental stepping stone to true VoIP services? If yes, do you believe that ENUM should be implemented centrally by a third party (e.g. a government agency)? If no, what are your alternative plans to provide IP address look-up services (e.g. implementation of individual databases)?

SLT views ENUM as a solution for address and numbering resolution. As identified in our response to Question 18, SLT would be willing to participate within an industry body to develop both requirements and solutions for address and numbering resolution

To date, SLT has tested an ENUM Server, but has not yet deployed the platform or implemented the Service. As ENUM is intended for use between operators to support routing and interconnection of calls or sessions, SLT will continue to use its own internal address resolution systems until such time as the industry agrees on a common approach.

Question 20: How important is it for you that a subscriber can keep their current phone number when migrating from PSTN to NGN? Do you think that a change in phone number may be a barrier for the adoption of NGN services?

There are two separate issues here. If a customer migrates both to an NGN and to another operator, whether or not they can keep their number rests on whether or not there is a cross industry number portability regime in place.

Where a customer is migrated by their network operator from a legacy platform to an NGN platform there is no reason why the number should not be retained. It would

delay the introduction of NGNs if customers felt migration was an inconvenience rather than a benefit. The ability to retain a given number would remove one possible cause of inconvenience and concern.

Question 21: Do you plan to adopt IPv6 in your network? If so, when will you do so in relation to the milestones describe in your transition to NGN? What are the key transformation phases involved in migrating your IP network to IPv6?

SLT has implemented IPv6 in its network Infrastructure that supports ISP services.

All other IP Platforms in the SLT NGN have IPv6 capability -however IPv6 has not yet been implemented in the core transport network.

4. Commercial Issues

Question 22: Please describe your views on the competitiveness of the markets for voice and data services today, including both domestic and international leased lines. What are the current roadblocks to increasing the competitiveness of these markets, if any? What regulations, if any, would you recommend to overcome these roadblocks?

The question presumes competitiveness is currently inadequate and that there are therefore barriers to be identified and overcome. This highlights the importance of market analysis. Recent regulatory action to set price floors suggests that the level of competitiveness in voice services is more than adequate and may be approaching excess.

Competition in Sri Lanka is more than 20 years old. 19 years of regulation have fostered and developed competition and created diversity and customer choice. That process is now mature, and regulation needs to change perspective and approach.

Fixed and mobile networks have relatively high fixed costs and are prone to economies of scale and scope. There is therefore a balance to be struck between the number of competitors and the efficiency of the networks they build. Too few and consumers do not benefit from the stimulus to innovation and efficiency of competition; too many and overcapacity is created leading to distressed prices, inefficient investment and reduced levels of forward investment.

A regulatory focus on “roadblocks” to competition in markets so over-competitive intervention is needed to hold prices up is misplaced. Regulatory priorities need to be better aligned with incentives to invest; not in assets where capacity is already adequate or in excess, but in those parts of the market where commercial deployment is not economically justified.

Experience in other markets is that competition in communications follows a cycle: many players enter the market, some prosper and others fail, and there is then a period of consolidation, with a smaller number of players emerging with enduring and commercially successful business models. This consolidation is not harmful to consumers or competition. It reflects the fact that network competition is capital intensive and that networks have economies of scale and scope. A key strategic issue for regulators is at what point does the continued promotion of competition become counter-productive and no longer in the interests of consumers.

Both mobile and fixed markets are showing signs of saturation. Fixed access volumes have hovered around 3.5 million for the last three years. Mobile numbers have rocketed to nearly 16 million but growth is slowing.

For these reasons SLT believes that so far as voice services are concerned TRCSL needs to refocus its energy from promoting competitive diversity to promoting investment and network extension into rural areas.

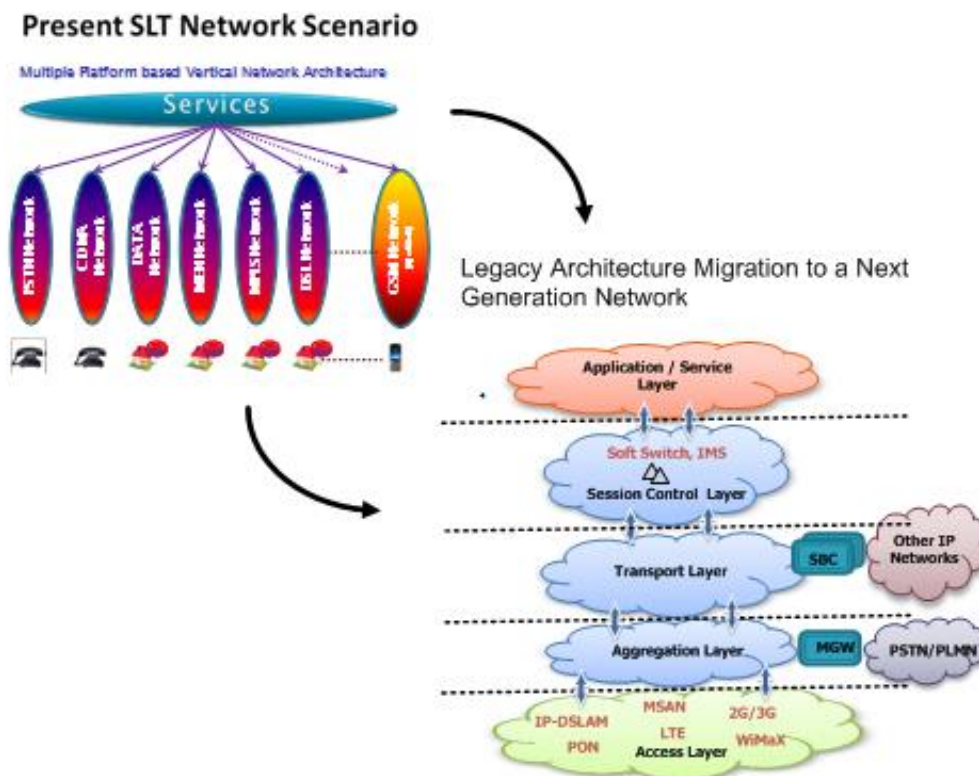
Competition in data services over mobile is younger and still maturing, but developing swiftly. Similarly, competition for supply of consumer broadband over fixed networks is at an early stage and our views as to how it might be further fostered are covered in our response to question 32.

SLT has a rich portfolio of leased line services offering a wide range of bandwidths and price points. It sees the wholesale market as a positive opportunity and is growing its wholesale business at 25% per annum. SLT faces competition for its leased line services, and has very recently made significant price reductions both to respond to competitive pressure, and better to match its customers' requirements.

International leased lines are part of a global market with intense global scale competition.

Question 23: Please describe your current network architecture. What are your current plans to implement NGN networks and/or offer VoIP or other IP services? What are the roadblocks that you perceive to that migration? What regulations, if any, would you recommend to overcome these roadblocks?

SLT is moving from a network organised vertically under specific services to a more versatile NGN. In conventional networks, the relationship between Service and network is tightly coupled. Our network build and migration moves services and customers to a single Next Generation Network platform, where services and network transport capabilities are organised in horizontal layers, and are able to inter-work across interfaces defined by industry standards.



The SLT NGN transformation programme has developed and published release A of the SLT NGN Architecture. For more details please see Annex 1.

The TDM replacement programme has been underway since 2005, and is expected to be largely complete in 3-5 years. The NGN transformation programme has delivered

a service layer strategy for SLT and is currently developing the first phase of legacy service migrations.

In addition to carrying transformed PSTN voice services over the NGN core transport network, SLT currently provides VoIP services for business users.

5. Regulatory and Legal Issues pertaining to NGN

Question 24: Do you see asymmetric regulation as appropriate for regulating NGN in Sri Lanka? If so, what obligations should be imposed on the dominant operator(s) and the non-dominant operators? What do you see as the most significant advantages and disadvantages of such an approach in Sri Lanka, and what roadblocks do you see to its implementation?

The question raises asymmetric regulation specifically in the context of NGNs. But the text of the TRCSL consultation question suggests asymmetry is being considered for both legacy and NGN networks.

The Sri Lankan communications market has developed rapidly, successfully and competitively without recourse to asymmetric regulation. Asymmetry is an intrusive and onerous tool, used to remedy issues arising from significant market power. The deployment of NGNs does not create a new market power issue warranting so significant and material a change as the introduction of regulatory asymmetry. Indeed NGNs are so new market power arising from them does not exist or need remedy.

Any advantage an operator may gain by being quick to build an NGN is not market power requiring redress, but the first mover advantage that comes from being willing to take risk and invest ahead of the market moving more generally. It would be wrong in principle to penalise this form of initiative. Investment in innovation would be severely inhibited if regulators removed through asymmetry any advantage gained through early investment.

At this stage, regulation of NGNs on an asymmetric basis would be premature, unwarranted and counterproductive.

If asymmetry is contemplated in respect of SLT's legacy services the case is equally weak. SLT market power was greatest when competition was first introduced. Asymmetry was not judged necessary then. For twenty years market power has been steadily eroded until, as we show in our introduction, the market for pre NGN services is highly competitive, with an SLT competitor holding the largest market share. Asymmetry at this stage is neither necessary nor proportionate.

The consultation refers to two forms of asymmetric regulation. While SLT does not believe there to be a case for either form in the circumstances of the Sri Lankan market, given that both are mentioned we should pass comment on their relative merits.

SMP based regulation is based on a disciplined market definition, a careful process of analysis and a limited and focussed degree of intervention to the extent necessary. It provides for regular reviews and for asymmetry to be withdrawn as market power is lost.

Dominance based regulation lacks these qualities. It regards the whole of the entity as tainted by dominance and the regime. This makes life very unpredictable and uncertain for the operator concerned, who may or may not face intervention at any time and in any part of their business.

Dominance based regulation is not open to the same selective application and timely withdrawal as an SMP framework. The only advantage of the dominance approach identified in the consultation is that it is convenient for the regulator. That is not a worthy argument: what matters is what produces the best outcomes for consumers and society. On that measure dominance is much the inferior approach.

We deal with the question of wholesale access in responses to later questions.

Question 25: Do you see value in maintaining a two-tier regulatory structure (facilities-based and service-based licensing) to accelerate growth of the Sri Lankan telecoms industry particularly in light of NGN? What do you see as the most significant advantages and disadvantages of such an approach in Sri Lanka, and what roadblocks do you see to its implementation?

NGNs are in part designed to offer better support to service developers and innovators. So it is right to consider how the future regulatory regime can best reflect a world with competition at both the infrastructure and the service level. NGN's only get built if operators can see that they will be allowed to provide service themselves without incurring additional regulatory burdens. So a first consideration for licence development is how can it support and reward those whose investment is vital to the development of NGN services.

SLT believes a two tier licence structure can be made to work for an NGN world. There is a distinction between the responsibilities faced by those who provide infrastructures which must interconnect and interoperate, and those who provide services over them.

In developing a two tier licence structure we believe TRCSL should take care to avoid applying different conditions to operators and service providers when competing with one another as service providers to retail markets. It would be wrong for those who build networks to be disadvantaged in any way when competing for retail customers with service providers reliant on the infrastructure they have built.

Equally it would be wrong for consumers to face two different degrees of protection, depending on whether they took service from one form of licence holder or another.

In an NGN environment the provision of service and the provision of networks are much less tightly associated. Services are carried over networks rather than generated by them. The network an operator builds not only provides the services the operator chooses to provide, but is also available to others. Licensing needs to recognise that the service a customer receives may well be provided independently of the network the customer uses. Regulatory objectives in relation to services may no longer be achievable solely through regulation of operators.

It is possible that as NGN markets develop the boundary between service providers and infrastructure operators will blur. Service providers may come to wish to connect to networks to control service parameters in some way. For this reason we suggest that the licence obligations relating to interconnection and interoperability apply if service provider interconnection or interoperability is required and the licensing status be reviewed.

Question 26: Please propose any other specific amendments to the licensing framework to promote the growth of service-based competition for NGN. In particular, please identify any regulatory obligations that ought to be excluded from a service-based licence (i.e. Class Licence), citing detailed justifications.

For the reasons set out in response to question 25, we believe there is a need for caution in relieving class licence holders of too many obligations. Consumer protection measures should apply to all operators. Exemption from interoperability and interconnection obligations should be based on whether interoperability or interconnection is required.

Question 27: Do you agree with the above proposal to sub-divide service-based licences into two tiers, i.e. 'standard' and 'simplified' Class Licences, based on the service offered? If so, which services should be subject to the light-touch 'simplified' licence, and why?

SLT welcomes steps which help it to understand what type of provider it is dealing with and what obligations both parties have towards one another. A sub-divided scheme could work if the division, and the terms each form of licence holder faces are clear and logical. But we suspect that the boundary may prove difficult to define and sustain as new services emerge and evolve.

Finally, while SLT supports TRCSL's intention to licence all NGN service providers we are concerned that the potential volume may prove challenging and that regulation of providers based offshore may prove difficult, potentially resulting in domestic providers operating under tighter controls than offshore competitors.

Question 28: What are your views on how USO should be implemented for NGN technologies? How should the funds be raised, and how should they be disbursed? Should they target basic voice services or advanced data services?

A Universal Service Obligation is something mandated by society, reflecting a judgement by society that a service has become so widespread, and so important, that no-one should be denied reasonable access to it. It will be some time before that point is reached for broadband access technologies.

SLT set out in the introduction to this response a vision of everybody being able to access broadband and 90% of those on fixed wired lines being able to access very high broadband speeds of 20Mb/sec or more. This would deliver the "every village will have communications services" vision outlined in the budget speech.

SLT will, under a regulatory environment that facilitates an extension of its network, improve its access services, develop its NGN and build much closer to the vision of everyone in Sri Lanka being connected and able to get broadband service. But while we will get much deeper into rural areas there will not be commercial grounds for 100% coverage. It is here that a universal service scheme could be of immense value.

We suggest TRCSL works with SLT and the rest of the industry to agree a vision, (that every Sri Lankan in the nation has access to broadband) to define the areas of the country where help is needed, and to agree a funding and delivery mechanism. The same body could also help TRCSL identify the regulatory actions which would support

the greatest possible commercial network reach and thus the smallest remaining need for USO support.

Question 29: Please comment on whether a new set of interconnection rules should be promulgated, or whether the existing Interconnection Rules 2003 should be amended to provide for interconnection in IP-based networks.

SLT believes the Interconnection Rules 2003 should be reviewed by TRCSL, which should consider:

- Definition of the role of National Standards Bodies identified in Question 15, including the scope of their work and the procedures for enforcement in the event that non-compliance is discovered.
- The scope of the current rules appears to be confined to Fixed and Mobile voice services. The scope does not currently define session based communications between users and applications.

Question 30: Is there a need for a RIO to be offered by a dominant operator? Please identify the terms and conditions you would require in a dominant operator's RIO. Is there any need to change the regulatory approval process for RIOs?

SLT does not believe it is now dominant in either legacy or NGN markets. But we can see the benefit of a reference offer which sets out clearly and publically the standard terms on which we offer interconnection. We believe other operators should be encouraged to do the same, and that TRCSL should approve the RIOs offered. Once a RIO is approved agreements based on it should not need further TRCSL endorsement.

Operators should remain free to reach bilateral agreements on terms they each agree, with the reference offer available as a default.

Question 31: Do you think that further regulatory measures should be taken to promote Competition in the core network in Sri Lanka? If so, which parts of the core network are most important to promote entry and competition in retail markets? Will these measures have an impact on NGN network investments?

SLT has for some time recognised the importance of wholesale customers and has a team dedicated to their support and account management. It already offers domestic and international leased lines and infrastructure services, all without the need for imposition of regulatory obligations. A positive approach to wholesale customers and their needs is firmly embedded in SLT's forward strategy.

SLT places importance on meeting the needs of its wholesale customers and will discuss with them how NGN based services can meet their future needs for leased circuit functionality.

The NBN offers the prospect of further wholesale network services. SLT believes that integration of the NBN with its NGN offers the swiftest means of bringing the NBN, and the services it supports, to market for the benefit of wholesale customers.

Question 32: Do you think the introduction of wholesale access to the access network would benefit the consumer? What type of wholesale access would be most beneficial for Sri Lanka? Will these measures have an impact on NGN investments?

A wholesale broadband access product provided by SLT could help competitors offer broadband services to customers.

SLT believes any wholesale broadband access service should be future proof for the purchaser and designed to reflect and support its planned network architecture.

This means offering a bitstream type service at the two or so central network nodes of the NGN structure. This would provide wholesale broadband to all customers whose lines supported the service. Our intention would be to offer an Ethernet presentation, which would be consistent with present and future broadband delivery, whether based on current copper, fibre extended to the node or cabinet, or fibre extended to the premise.

This form of wholesale broadband is consistent with our network evolution, offers competitors the opportunity to share in our broadband for everyone vision, and would endanger neither the NGN deployment nor the access improvement programmes we have described.

Alternative forms of wholesale service based on the existing copper network would suffer a number of major drawbacks. The copper access market is far from pervasive. Of 3.5 million fixed access connections just under 900,000 (25%) are copper based.

The speed of broadband service delivered is crucially influenced by line length. Longer lines have weaker signals. In denser urban nations lines are comparatively relatively short and the vast majority will support basic broadband. In Sri Lanka lines are longer and only 75% can support 512 Kbps broadband and just 54% will support broadband at 3 Mbps. the minimum speed for IPTV.

We regard our priority as improving the capability of the access network, by extending fibre reach, adding new copper and rationalising the supporting network architecture through NGN. For these reasons we believe strongly that the right form of wholesale broadband service is a forward looking product based on our future architecture and supporting and using our access improvements.

The alternative, of products based on the existing network and copper access would be wrong in multiple ways. Wrong for competitors because of the severe service limitations and lack of future proofing. Wrong for SLT because it would slow network improvement both in access and in rationalising the network architecture. And wrong for the country because it would slow progress to a fit for purpose broadband for all.

Question 33: Do you agree with the principles of net neutrality and technology neutrality for promoting service-based competition under NGN? If so, please provide suggestions for how to implement each principle. If not, please explain and provide any alternative or supplemental principles to consider. What impact, if any, will your suggestions have on incentives to invest and the ability to compete using NGN networks?

SLT believes regulation should so far as possible be technology neutral.

This TRC consultation question is somewhat confusing in its commentary on technological neutrality. It says that important regulations, such as QoS or emergency access, should be applied to services that consumers would reasonably expect to be similar to their legacy service, and that regulations should be applied to similar services regardless of the underlying platform. It then argues that voice services over fixed telephony and voice services over VoIP should be treated differently, because consumers will have different expectations because of the different underlying platforms. There is an obvious contradiction here.

There is a more important underlying point. In a legacy world services such as Skype are used by customers who are free to revert to traditional fixed telephony as they choose. In this sense the VoIP product is less a substitute for fixed voice and more a supplement. But in an NGN world VoIP will be positioned as a substitute for fixed voice. It is important, therefore to ensure that consumers are protected and gain the service quality and capability that they need, whether using fixed voice or its VoIP substitute. Indeed the principle of technological neutrality makes clear that they should.

Net neutrality is a term which confuses but seldom illuminates. NGNs will offer different levels of service quality to different services and it would be foolhardy to require otherwise. Voice traffic needs assured service levels that data traffic does not. Real time sports HDTV may need different service levels to video downloads. Multi-player gaming will make different demands to web browsing. Network operators need to be encouraged to respond to these different customer needs by developing different offers and charges.

Where an operator has been found to have SMP – and no SMP findings have yet been made in respect of NGNs – regulators may wish to require that an operator does not unduly discriminate between similar customers, such as between two HDTV service providers. But regulators should avoid stifling innovation through more generic obligations.

As a matter of principle SLT does not have a general intention of discriminating between like service providers using its network. But it does need to be free to set different service standards at different prices, to adopt fair measures to protect its network from abuse and overloading (which may, for example require some generic treatment of peer to peer traffic or streaming) and to comply with security and other standards and obligations.

The law of unintended consequences can come to apply if somewhat rather ambiguous principles like net neutrality are adopted in advance of understanding the circumstances under which they might apply. SLT recognises the legitimate concern over possible unfair discrimination, but is not at this stage convinced that a formal remedy is required to what remains a theoretical anxiety. We note that the ITU advice to regulators is:

“There is, however, good reason to hesitate with respect to strict regulatory interventions in QoS on the Internet, due to the extremely dynamic character of Internet technologies and services and the relatively early stage of its development.”

Question 34: Do you believe that new charging arrangements should be imposed for NGN

interconnection? Do you believe that interoperability standards need to be imposed for NGN networks? Should these new regulations be imposed on all operators, or only dominant operators?

For charging arrangements, we have suggested that operators develop reference offers which TRCSL approves, and that they may in addition reach commercial agreements bilaterally, with the reference offer as a backstop. This is distinct from and superior to a regime where a regulatory simply imposes a charge. It is better for all parties, the regulator and customer included, if the regulator is invited only to resolve outstanding matters, leaving it for the industry first to seek to reach agreements bilaterally or collectively. This is particularly the case for NGNs, where new charging principles may well emerge.

We have suggested previously that interoperability should be set within an industry body supported by all operators all of which abide by its findings. TRCSL's role is not to impose a standard, but to create an industry mechanism through which standards can be agreed and adopted. TRCSL should retain the ability to determine and impose, but as a matter of last resort rather than standard practice. TRCSL also has the role of ensuring, through licensing, that all those who actually interconnect or interoperate are obliged to do so under the conditions the industry mechanism agrees.

Question 35: Would it be appropriate to apply tariff control only to dominant operators? Please explain, and provide relevant examples where tariff review may be needed, or where it is not needed and imposes unnecessary regulatory burdens.

The consultation is unclear whether the question refers to legacy or NGN markets. It presupposes that a tariff control is required. It is unclear whether the control referred to relates to a minimum tariff level or a maximum.

For legacy retail fixed and mobile telephony services, as we have previously demonstrated, there is no case for maximum price regulation as the intervention on minimum tariffs shows. This applies whether tariff control applies to one or all operators.

The problem with a tariff regime restricted to the ex-incumbent is that it works well under monopoly or near monopoly conditions, but as competition develops it becomes a straitjacket. Competitors take the regulated price as a reference point and price relative to it. The incumbent feels constrained in developing new and innovative price structures. In effect, regulation begins to dictate both the structure and the level of prices. Once competition, from alternative fixed providers and from mobile, is sufficient to constrain price abuse there are gains, to consumers, competition and society, in freeing the market to operate. For legacy services Sri Lanka is in that position today.

For NGN services it is hard to see what justification there could be for tariff controls. Dominance or SMP are detectable and causes of concern in markets which are already operating. New NGN services have yet to emerge at the sort of scale that makes this an issue.

More fundamentally, tariffs relate to services. Under NGNs services and operators are likely to rapidly separate. The way services are presented will change, blurring the boundary between categories and making policing much harder. TRCSL may wish to

consider not seeking to regulate tariffs directly, but retaining a power to examine and challenge any specific tariff where it feels consumer interests or the maintenance of fair competition warrants.

Question 36: What kinds of consumer protection do you see being necessary to serve the needs of consumers in the NGN environment? For instance, are there any limitations to the provision of emergency services by IP-based telecom services provided over the NGN? Please list these, providing details and examples where possible. Do you foresee any specific difficulties/challenges in complying with consumer protection requirements in the NGN environment? From the consumer protection perspective, what additional obligations should be imposed on a dominant operator in the NGN environment?

The need for consumer protection does not abate as market share reduces. It is a question of fair treatment for all, not simply fair treatment only for customers of a “dominant” operator. A basic set of responsibilities for consumers should be accepted by any provider wishing to supply networks or services to Sri Lankan consumers. There is no good reason for excluding any consumer from the list of protection measures outlined in para 5.4.2 of the consultation, which should be applied to all classes of licence holder.

Whether there are additional consumer protection measures to be required of an incumbent is moot. What constitutes a protection measure so important that the incumbent must be obliged to provide, and so unimportant that all other providers are exempt? The examples cited, of obligations to unbundle bundles and to provide services upon reasonable request, are unpersuasive. The market will punish an incumbent that does not provide what its customer needs.

The separation of services and networks means that regulators seeking to protect consumers will need recourse to instruments allowing action to be taken in respect of service providers as much as operators.

Question 37: Do you foresee any particular competition issues arising between NGN networks and services and legacy telecommunications networks and service? Are current regulations sufficient to restrain merger/acquisitions activities which may have an anti-competitive impact?

This question does not arise out of the preceding narrative in the consultation. It is not clear what specific issue is of concern. Customers will migrate to NGN services as their existing provider converts its network and services or as other providers make offers that appear more attractive. There is no specific competition issue here.

Merger and acquisition activity and oversight is a highly specialised area and one generally best handled at a national rather than a sectoral level, especially in an NGN world where the boundaries between conventional sectors will become increasingly blurred and difficult to define in advance.

Question 38: Do you agree that a change in the current licensing regime needs to be introduced to realise the full benefits of NGN? If so, what licence changes need to be introduced in the transitional period to NGN? Do you have a view as to what changes in licences you would favour at each milestone of the transformation to NGN?

See our answers to questions 25 – 27

Question 39: Do you agree that the TRCSL should take the lead in requiring all licensees in the NGN to adopt compatible/similar technical standards? Or should this be left to the determination of market forces?

See our answer to question 12

Question 40: What consumer protection measures do you consider to be important for the migration period from PSTN to NGN

It will not be practical to warrant that any customer in any circumstances can continue to use the legacy service they are used to unchanged. Such an obligation could freeze migration. A requirement to allow continued use of legacy service at customer choice would in effect require the open ended operation of parallel networks, forgoing the economies of migration to an NGN. In those circumstances the case for investment would be changed and regulation would be at risk of frustrating NGN deployment.

Customers should be informed of change with good notice, should have the consequences of change explained, be shown the alternatives available to them and have the advantages of migration made clear. SLT agrees that operators should strive to ensure as seamless and painless a customer migration as possible.

It does not follow that new regulatory controls are required (beyond the establishment of industry groups to agree migration practices and resolve migration issues as previously proposed). This is a competitive market and so operators who do not treat their customers appropriately will be punished by the market.

Sri Lanka Telecom

November 2010

Attached: Annex One, SLT's NGN Programme

Annex One

SLT's NGN Programme

The PSTN Service Upgrade Programme

In 2007 SLT embarked on a programme to modernise the entire PSTN Infrastructure, replacing its legacy architecture of TDM based Telephone Exchanges with Next Generation Soft Switches and Media Gateways / Controllers. This Next Generation (Transformed) PSTN Service is supported by a NGN Compliant Transport Network, consisting of a core IP/MPLS Infrastructure, Service Edge, Access and Transmission networks.

To date, this TDM Replacement Programme has successfully migrated PSTN Service users from the legacy environment across around 26% of our customer base. A number of factors are used to determine the areas in which the TDM Replacement Programme will be implemented. These factors include the age and serviceability of the legacy PSTN equipment and its current Book Value.

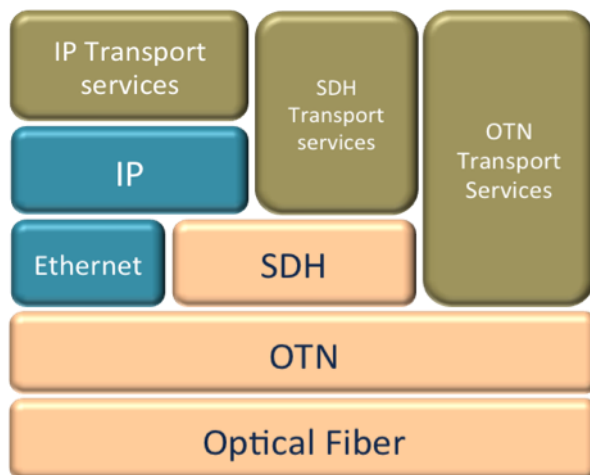
The NGN Compliant Transport Network is also used to deliver:

- Backhaul for xDSL Broadband services,
- Backhaul for Operator Circuits
- Layer 3 IP VPN and Layer 2 Ethernet VPN Services,
- Connectivity for a hosted Business IP Telephony service.

The Transmission Network Upgrade Programme

The SLT Transmission Network covers the entire Island and is predominately fibre based. An extensive programme of fibre deployment has been underway for over ten years to provide a resilient architecture of Interconnected, high capacity fibre optic rings. In the last three years, this programme has been accelerated to deliver more capacity for broadband and competitor backhaul requirements.

In addition to implementing fibre optic capacity, SLT has been planning a forward looking Transmission Switching Platform based on ITU-T optical transport network standards, to provide support for legacy transmission services such as SDH, as well as Ethernet and IP.



Protocol Hierarchy for Optical Transport Layer

Through this programme, SLT has already invested LKR 2.5Bn in developing a world class core backbone network capable of supporting Sri Lankan communications requirements throughout the 21st Century.

The SLT NGN Transformation Programme

In addition to the upgrade of the PSTN and the development of transmission and access networks, SLT has also embarked on a NGN transformation programme. The objectives of this programme are:

- to provide a new service infrastructure,
- to deliver a customer centric experience,
- to develop innovative products, and
- to ensure a rapid time to market for new services.

The goal is to provide a “simple and complete” communications service to customers, regardless of time or place. Services must be easy to buy and use. Users must be able to manage their own services. Services must be available to the user via any access network be it copper, fibre, or Wireless technologies such as 2G, 3G and WiMAX. Services must be available on any device from a fixed phone or set-top box to a mobile phone, PDA or PC. These new services will be based on applications and the delivery of content.

- A new platform for services based on the delivery of content and applications will be implemented and therefore a new multi-media session control layer will be required. Session Control will employ the Session Initiation Protocol (SIP).
- The applications environment will be architected to support both multi-media and mobile services. Interfaces to this open platform will be exposed to enable third parties to deliver services over the NGN Transport Network.
- To enable the ‘simple and complete’ vision, new Operational Systems that support Service Provisioning and Assurance will be developed according to

Open Industry Standards. These systems will have the capability to support external interfaces for other Service Providers.

To deliver this vision SLT needs a radically different infrastructure, and has therefore defined a multi-year programme to develop NGN Compliant Service and Control Layers to fully exploit the ongoing investment in its NGN Transport Network.

SLT NGN Requirements

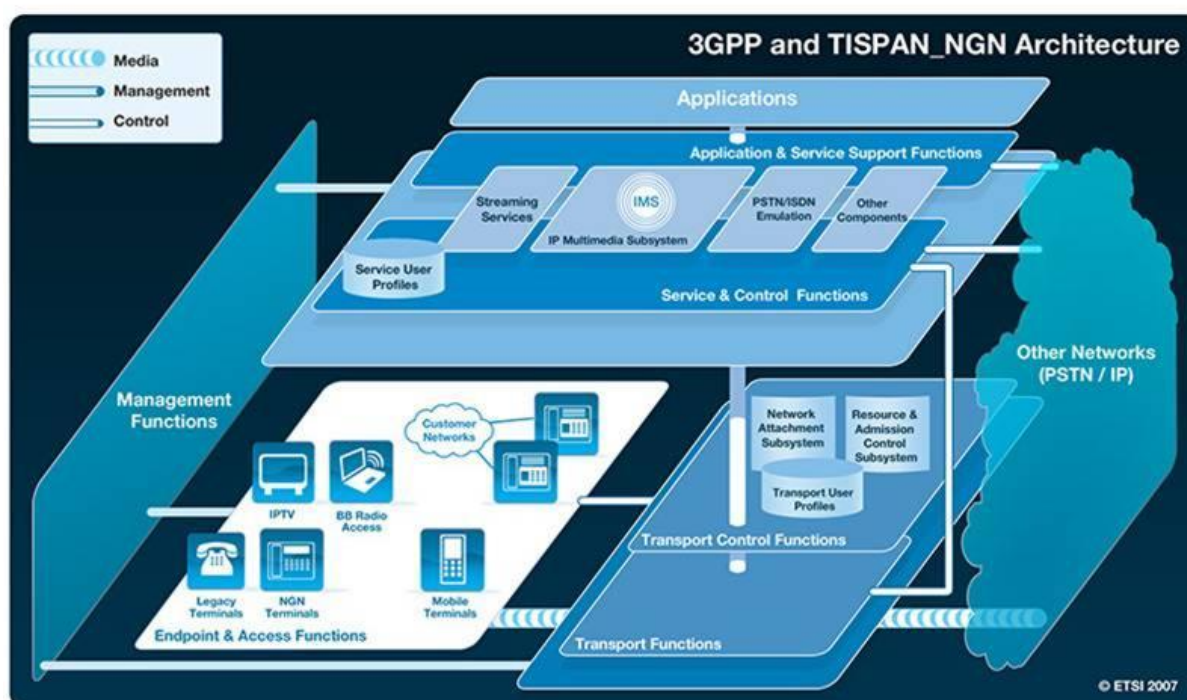
The following table identifies the requirements that SLT has used in developing its NGN Programme.

Quality of Service (QoS)	A NGN Network must be able provide better service to selected traffic, depending on the individual requirements of different types of service and also to meet requirements in customer Service Level Agreements (SLA). To achieve this, the technology should ideally be able to configure traffic paths to measure their performance to achieve guaranteed latency, jitter, packet loss and throughput targets (CIR, EIR).
Performance and Throughput	NGN must have sufficient bandwidth to be able to guarantee a committed level of performance for the full service portfolio of end users, with room for future growth. Depending on the technology, this may have interdependencies with the level of traffic engineering possible (QoS) and the scalability of the NGN Architecture.
Availability and Resilience	NGN networks must be able to recover from network outages, and multi-homing will be supported where feasible. A key availability requirement for a NGN is to be able to support a convergence time of 50 msec or less in response to a network event, in order to ensure continuity of a voice session that includes a path in the legacy PSTN.
Interconnect	There is a requirement for the Architecture to support NGN Multi Service Interconnect between SLT and Other Licensed Operators (OLO). Typically, the architecture for this Interconnect will need to define a Common Transport Function which can be utilised by specific services such as PSTN/ISDN Interconnect and Voice Line Control. Additionally, a generic framework will need to be defined governing technical specifications for Media, Signalling, Management, Overload Control, Numbering, Testing, Performance and Security.

Control	<p>As a key principle of NGN, General Mobility of users and devices creates specific requirements for dynamic QoS Policy Decision and Enforcement. In the future, the requirement for QoS marking and policing on a session can no longer be determined solely by which Port or VLAN the traffic arrives on at the Access Node or the Service Edge. The requirements of the users profile (containing details of what services and quality they are entitled to, or have paid / have enough credit for) needs to be combined with the capabilities of the terminal they are using, the access path technology they have connected via, and the media path they will be allocated for connection to the service they have requested. A generic model of entities and functions that can determine and arbitrate on these decisions in near-real time and on a session by session basis is required.</p>
Stability	<p>The Architecture of a NGN should be able to scale effectively to support expansion or contraction of services and end users. A key requirement for a coherent NGN Architecture is to ensure that as business, product and traffic requirements evolve - the Service, Control and Transport Layers can continue to function as a single network - with appropriate points at which capacities can be extended and capabilities added - without having to re-design the relationship between nodes, functions and interfaces.</p>
Congestion	<p>The network must be able to handle unpredictable surges in traffic, and appropriate load and overload controls must be built in at the design stage. This is essential to prevent the network behaving in a mode where increasing load results in a decreasing ability to process the load, and if uncontrolled would lead to a condition where the network would be unable to handle any load.</p>
Security	<p>NGN networks should not be vulnerable to security threats and should be able to guarantee the Confidentiality, Integrity and Availability of specific services. Along with Performance, Availability and Stability, Security requirements are fundamental to the operation of a NGN. Specific consideration needs to be given to the Interaction of Layer 3 Services with the Public Internet, as any network services or devices visible on the Public Internet are vulnerable to attack.</p>
Management	<p>Management systems need to have visibility of how the network is performing, and whether performance guarantees are being met. OAM for NGN networks should inter-work with other NGOSS platforms enabling all standard functional entities such as: Fault management, Configuration management (Fulfilment support), Security management, Performance management and Inventory management on all Network Nodes. The capability to perform remote test measurements and collect utilisation and administration data must be supported. OAM should support efficient remote provisioning with minimum complexity for bulk provisioning across Wholesale Interfaces.</p>

SLT NGN Architecture

The SLT NGN Transformation Programme has developed and published Release A of the SLT NGN Architecture. The SLT NGN Architecture is based on Standards and Recommendations for NGN published by the ITU-T and the European telecommunications Standards Institute (ETSI) under its TISPAN Programme.



The ETSI TISPAN NGN Architecture.

The SLT NGN Target Architecture uses the ETSI Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN) NGN Standard framework (Releases 1, 2 and 3) as its main reference. The ETSI TISPAN framework has been selected in preference to the ITU-T version, as although the standards they both contain are functionally equivalent, significantly more work has been done by ETSI TISPAN in further development of standards and functional profiles for non-IMS based services such as PSTN/ISDN Emulation and IPTV.

Use of the ETSI TISPAN framework will provide SLT with a clearly defined migration path from the current platform specific implementation of services that are present in all networks now, to a single (non IMS) converged platform. SLT is currently evaluating a Service Layer Strategy to determine when an IMS Platform may be required. The ETSI TISPAN framework contains a clearly identified development path toward implementations of IMS.