Consultation Paper No. 01/2014

Telecom Regulatory Authority of India

Consultation Paper on
Review of Tariff for Domestic Leased Circuits

New Delhi, the 24th March, 2014

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Stakeholders are requested to furnish their written comments by 14th April, 2014 and counter-comments by 21st April, 2014 to the Advisor (F&EA), TRAI. The comments may also be sent by e-mail to manishsinha@trai.gov.in. Comments would be posted on TRAI's website www.trai.gov.in. For any clarification/ information, Shri Manish Sinha, Advisor (F&EA) may be contacted at Tel. No. +91-11-23230752 Fax: +91-11-23236650.

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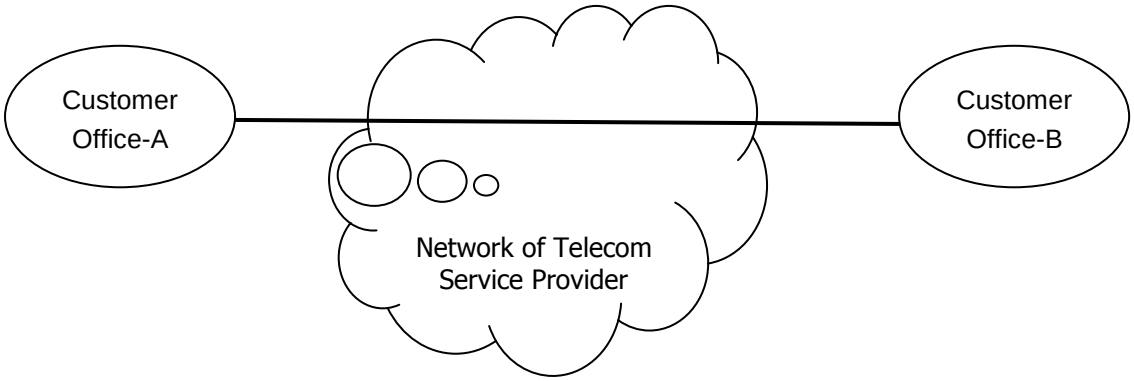
Introduction and Background

A- Domestic Leased Circuits

1.1. ITU has defined a leased circuit as "a two-way link for the exclusive use of a subscriber regardless of the way it is used by the subscriber". A leased circuit having both of its end-links within India is termed as a Domestic Leased Circuit (DLC). The following diagram depicts a typical DLC:

Figure 1.1: Block diagram of a typical DLC



1.2. As per the present licensing regime in the country, DLCs may be provided by the following telecom service providers (TSPs):

(i) National Long Distance Operators (NLDOs)

(ii) Access Service Providers (ASPs) viz. BSOs[1] and CMTS/UASL/UL[2] licensees

1.3. The DLCs carry data and voice traffic of customers from one place to another using networks of TSPs, without any interconnection with public networks. Enterprises, particularly financial institutions, business process outsourcing (BPO) organizations etc. having their offices spread out in the country lease-in bandwidth capacities (DLCs) from the TSPs. Besides, TSPs who do not own

[1] The term BSO is an abbreviation of Basic Service Operator.
[2] The terms CMTS, UASL and UL are abbreviations of Cellular mobile Telephony Service, Universal Access Service License and Unified License respectively.

sufficient transmission infrastructure in any geographical area also lease-in DLCs in order to provide various telecommunication services to their customers viz. voice telephony, Internet etc.

1.4. DLCs form crucial building blocks for e-commerce, e-governance, Internet access for the masses, BPO, IT and ITES industries. In the financial sector, banks are automating and expanding their branch networks to smaller cities through the use of DLCs. In the healthcare sector, collaborative sharing has become possible through the use of DLCs.

1.5. The TSPs can acquire bandwidth capacities either by creation of infrastructure or by leasing-in from other TSPs. The leasing-in of DLCs obviates the need for building the circuits, which require heavy upfront investment and significant maintenance cost. For the provider of these circuits, leasing-out allows additional income from their investments by utilizing spare capacities. Thus, leasing offers potential advantages to both seeker and the provider.

1.6. Given the fact that DLCs provide the backbone for not only the telecommunication service sector but also a host of knowledge based industries, these are arguably key inputs for the economic growth of the country.

B- Tariff framework for DLCs in India

1.7. Section 11(2) of the Telecom Regulatory Authority of India Act, 1997 empowers the Authority to notify rates for various telecommunication services. In exercise of these powers, the Authority has been notifying tariff for telecommunication services including DLCs.

1.8. The Authority while formulating the Telecommunication Tariff Order, 1999 (hereinafter referred to as TTO, 1999) specified distance-wise cost based ceiling tariff for DLCs of 64 Kbps and 2 Mbps bandwidth capacities.

1.9. Subsequently, in 2004-05, the Authority reviewed the tariff for DLCs through a consultation process and restructured the tariff framework for DLC vide the telecommunication Tariff (36th Amendment), Order, 2005 (hereinafter referred to as TTO (36th Amendment), 2005) dated 21.04.2005. The ceiling tariffs for DLCs prescribed through the amended Order were significantly lower than the ceiling tariffs of equivalent capacity prescribed in the year 1999. As on date, the ceiling tariffs for DLCs of 64 kbps, 128 kbps, 256 kbps, 2 Mbps, DS3 (45 Mbps) and STM-1 (155 Mbps) capacities prescribed through the TTO (36th Amendment), 2005 are in operation.

C- Need for Review

1.10. In the intervening period since the year 2005, the Indian telecom services market has witnessed a remarkable increase in the supply and demand of DLCs and significant advancements in the transmission technologies. As a result of these factors, the market for DLCs in the country has undergone several changes. The following facts depict the status of present DLC market in the country:

(i) **Prevailing Tariff is significantly below the ceiling tariff prescribed by the Authority, particularly on the dense routes**: Most of the service providers use the ceiling tariffs prescribed by the Authority through the TTO (36th Amendment), 2005 as their base tariff and offer discounts depending on the bandwidth, distance, location, volume of business etc. The discounts with respect to the ceiling tariffs are generally much higher on the dense routes.

(ii) **Reduction in Cost:** Per unit cost of providing DLC has reduced owing to advancements in the transmission technologies and increased demand particularly on the dense routes.

(iii) **Customers are seeking higher bandwidths**: The TTO (36th Amendment), 2005 prescribes ceiling tariffs for transmission

bandwidths up-to STM-1 (155 Mbps). However, DLCs of much higher bandwidths are also being subscribed for, for which no ceiling tariffs have been prescribed through the Tariff Order.

(iv) **New Technological Developments**: New methods of provisioning DLCs viz. MPLS-VPN[3] have emerged which have not been covered in the TTO (36th Amendment),2005.

Enterprise customers having a large number of geographically dispersed offices in the country prefer VPNs in place of P2P-DLCs. Many TSPs in the country have already upgraded their transmission networks to provide VPNs to their customers. Through the TTO (36th Amendment), 2005, distance based ceiling tariff for dedicated P2P-DLCs were prescribed for various bandwidths. Since the VPNs are not provisioned on the basis of distances, tariff ceilings prescribed by TRAI for DLCs are not applicable to the VPNs. As a result, the tariffs for VPNs are not under tariff regulation presently. The ubiquitous use of VPNs by enterprise customers across the country raises a question as to whether the tariff for VPNs needs to be regulated.

(v) **Disparity among Routes and Geographical Areas:** The other areas of concern are the routes and geographical areas (particularly the remote and hilly areas such as North East, Assam and J&K service areas) where the demand for DLCs is relatively low and competition is much less vigorous. As a result, the tariffs of DLCs in these areas continue to remain near the ceiling tariffs prescribed by the Authority through the TTO (36th Amendment), 2005 even though the per unit cost (in bandwidth terms) of provisioning DLCs in such areas may have reduced significantly owing to advancements in transmission technology and increased utilization of the network. Such a situation requires a relook of tariff framework for DLCs so that prices of DLCs remain cost oriented.

[3] MPLS-VPN is an abbreviation of Multi Protocol Label Switching-Virtual Private Network.

1.11. In the light of the above, it is deemed necessary to undertake an exercise to review the framework for tariffs for DLCs.

D- The Present Review Exercise

1.12. The present review would require a detailed costing analysis and a careful assessment of the state of competition in the DLC segment. Importantly, the tariff framework for DLC should be such that the tariffs are affordable to the customers and in turn can spur demand from customers. At the same time, there should be sufficient incentive to TSPs for further investment.

1.13. As an initial step, on 22.11.2013, the Authority asked the TSPs to provide information on subscriber base, revenues and prevailing tariffs in respect of DLC. Subsequently, on 06.02.2014, the TSPs were asked to provide information on transmission infrastructure and its architecture used for providing DLCs including VPNs.

1.14. Through the present Consultation Paper (CP), the Authority intends to seek the inputs of the stakeholders on issues pertaining to the tariff framework for DLCs in the country. The chapter-wise contents of the CP are as below:

(i) The Chapter-II traces the development of DLC market in the country over the past two decades.

(ii) The Chapter-III explores the various approaches to determine the tariffs for DLCs in the country.

(iii) The Chapter-IV enlists the issues for consultation.

Chapter-II
Market for DLCs in India

A- Modes of offering DLCs

2.1. A DLC system may use any media (copper, fiber or wireless) and may be provided through passive, circuit switched or packet switched network. As per the Unified Access Service License (UASL), *"Leased circuit is defined as virtual private network (VPN) using circuit or packet switched (IP Protocol) technology apart from point to point non-switched physical connections/transmission bandwidth."* Thus the TSPs can offer DLCs in the following two modes:

(i) point-to-point DLC (P2P-DLC)

(ii) Virtual private networks (VPN)

(1) P2P-DLC

2.2. The P2P-DLC connects two offices of a customer through a dedicated transmission bandwidth. Some important features of P2P-DLCs are as below:

(i) **Security**: The customer gets an end-to-end dedicated transmission bandwidth between its offices i.e. the bandwidth leased-out to a customer is not shared with any other customer. Thus the communication through P2P-DLC is fully secure.

(ii) **Reliability**: The customer gets a guaranteed bandwidth at all times.

2.3. In case a customer places a request to a TSP to link its two offices (office-A and office-B) through a P2P-DLC, the TSP would connect the office-A and office-B with its nearest point-of-presence (POP). The TSP would have to connect the middle segment between the two POPs using its core network. This may be explained with the help of the following diagrams:

Figure-2.1: Connecting two offices through the same POP of the TSP

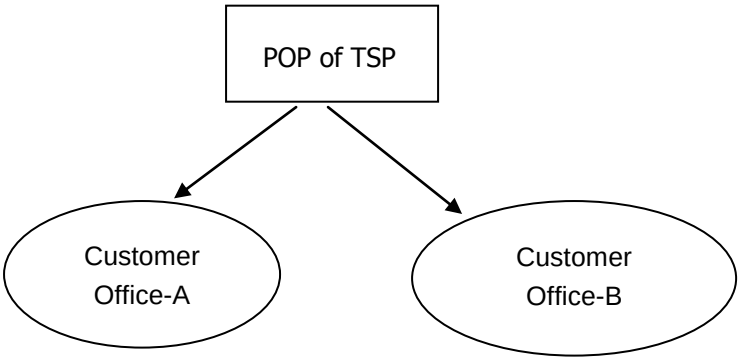
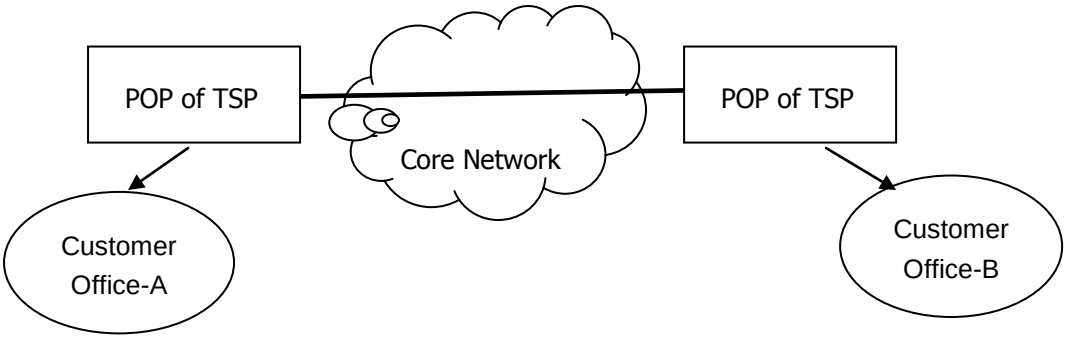


Figure-2.2: Connecting two offices through different POPs using Core Network of the TSP



2.4. In the above figure, the segment connecting the customer office with the POP of TSP is termed as 'end-link' or 'local lead' whereas the segment between the two PoPs is called 'trunk segment'. Thus a P2P-DLC generally comprises of one trunk segment and two local leads.

(2) VPN

2.5. A virtual private network (VPN) is a network technology that creates a secure network connection between two offices of a customer over a public network of a TSP. Though a VPN is not a private leased circuit, it provides the functionality of a private leased circuit across a shared network. Typically, the enterprises subscribe for VPNs so that their remote offices can get a secure access to their organization's network resources (e.g. customer resource management data base).

2.6. There are a number of VPN protocols that secure the transport of customer's traffic over a public network infrastructure. By encrypting data at the sending end and decrypting it at the receiving end, these protocols send the data of a customer through a 'tunnel' that cannot be 'entered into' by any other data.

2.7. In case an enterprise desires to connect 'n' number of its offices by connecting every site to every other site using P2P-DLCs of a TSP, it would require n*(n-1)/2 number of P2P-DLCs. On the other hand, it can subscribe a VPN by connecting each site with a single link to the public network (such as MPLS network) of a TSP which would require only 'n' number of links. This can be illustrated with the help of the following figures:

Figure 2.3: Connecting 'n' offices of a customer using P2P-DLCs

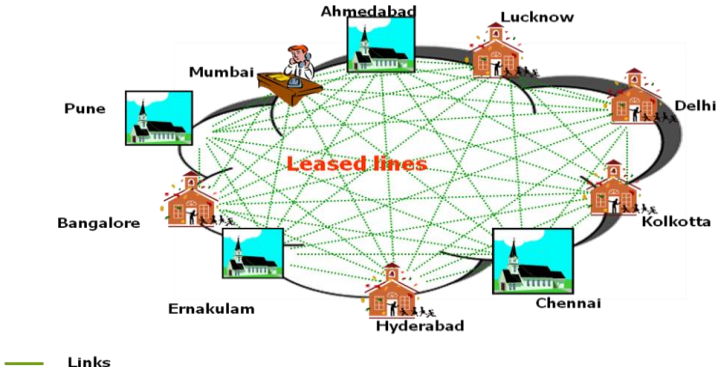
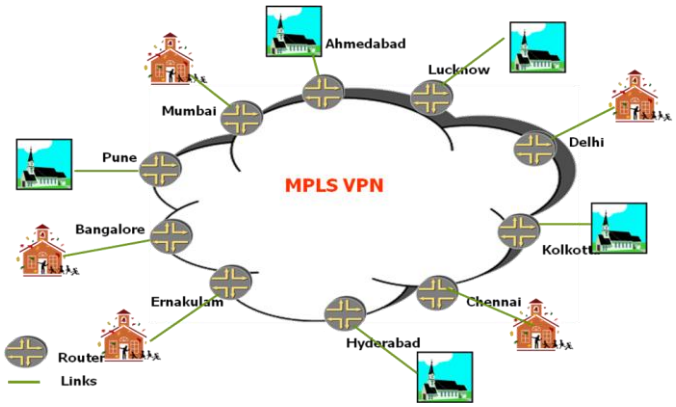


Figure 2.4: Connecting 'n' offices of a customer using VPN



2.8. The VPNs can be provided over different OSI[4] layers such as layer-2 (data-link layer) or layer-3 (network layer). Multi Protocol Label Switching (MPLS) is referred to as a 'layer-2.5' protocol since it brings the best of both layer-2 and layer-3 – it forwards packets with the speed of layer-2 while preserving the scalability and dynamic capabilities of layer-3.

2.9. In the past one decade, many TSPs in the country have deployed MPLS networks. Of late, the MPLS-VPNs have become more favorable as compared to P2P-DLCs for enterprises to connect their various offices in the country. The following factors may be attributed for such a shift in the customer choices:

(i) **Cost Effectiveness:** As illustrated with the help of Figure 2.3 and 2.4 above, the cost of a VPN would generally be much less as compared to the cost of P2P-DLCs for an enterprise to connect its various offices to the organizations network resources. This is particularly true if the customer has to connect a large number of its offices.

(ii) **Scalability:** VPNs such as MPLS-VPNs can be scaled much easily as compared to P2P-DLCs. A new office may be included in the VPN simply by adding a link from the customer's office to the nearest POP of the TSP's MPLS network.

2.10. Though VPNs do not offer the kind of reliability offered by a P2P-DLC, network redundancy 'built-in' in the MPLS core network allows the TSPs to serve their customers in a fail-safe manner.

B- Development of DLC market in the Country

2.11. The demand for DLCs in India started picking up in the middle of 1990s when many service sectors particularly financial services, BPO, IT, ITES and telecommunication services began proliferating in the country owing to new

[4] The Open Systems Interconnection (OSI) model is a conceptual model that characterizes and standardizes the internal functions of a communication system by partitioning it into abstraction layers.

liberal policies of the Government. At that time, Department of Telecommunications (DoT) was the sole provider of DLCs in the country.

2.12. During this period, the telecom access service segment was in its early stage of growth. Many new TSPs viz. cellular mobile telephony service providers, basic service providers, ISPs were setting up telecommunication infrastructure in the country for providing services to their customers. While the incumbent service provider (erstwhile DoT now Bharat Sanchar Nigam Limited) had a nation-wide footprint, many of the new TSPs had a limited and scanty presence in the country. In order to provide a full suite of services (e.g. local, STD, ISD), these new TSPs had to depend heavily upon DoT for not only interconnection with its fixed-line network but also for long-haul and short-haul bandwidth capacities through DLCs.

(1) Through TTO, 1999, DLC was brought under tariff regulations.

2.13. In the year 1998-99, the Authority undertook a comprehensive consultation process for formulating tariff regime for various telecommunication services including DLCs. During the consultation, it was strongly contended by many stakeholders that tariffs for DLCs in the market were significantly higher than the underlying costs thereof. After a careful analysis, the Authority concluded that leaving the tariff for DLCs under forbearance might lead to distortions in the telecom market; prescribing cost-based ceiling tariffs for DLCs would not only enhance demand for DLCs but would also provide a strong impetus to the growth of the telecom sector. Accordingly, through the TTO, 1999 dated 09.03.1999, the Authority, *inter-alia*, mandated cost based ceiling tariffs for P2P-DLCs of 64 kbps and 2 Mbps bandwidth capacities. The ceiling tariffs were prescribed for various distances in a distance interval of 5 km, beginning from 5 km to 500 km (apart from more than 500 km).

(2) NLD Sector was opened for Private Participation in year 2000.

2.14. In line with the vision of New Telecom Policy (NTP) 1999 to open NLD service to private operators for competition, the Government announced on

13.08.2000 the guidelines for entry of private sector in the NLD services without any restriction on the number of operators. As a result, apart from the incumbent operator viz. Bharat Sanchar Nigam Limited (erstwhile DoT), three new operators entered into NLD segment viz. Bharti Airtel Ltd, Reliance Communication Ltd and Videsh Sanchar Nigam Ltd (now Tata Communications Ltd).

2.15. Between the year 2001 to year 2004, the new set of NLDOs made significant investments in building long distance bandwidth capacity in the country. As a result, several thousands of kilometers of optical fiber cables (OFC) were laid in the length and breadth of the country. As the supply of bandwidth capacity increased particularly between large cities, DLC segment for the first time witnessed competition in the country.

2.16. This was also the time when business process outsourcing (BPO) business in India was entering into its growth phase backed with the emergence of third party BPOs and entry of IT majors into the business. These BPOs required reliable, scalable and affordable bandwidth capacities to connect to their domestic and international customers. While bandwidth capacities built on OFC by the new NLDOs were highly reliable and easily scalable, the emerging competition in DLC segment helped BPOs in getting much cheaper tariff for DLCs. This contributed in the growth of BPOs in the country in a big way. As a result, revenue of BPO industry witnessed more than 40% Y-o-Y growth during this period.

(3) Tariff framework for DLC was revised through the TTO (36th Amendment), 2005.

2.17. In the year 2004-05, TRAI conducted a review of the tariff for DLCs, which led to the finding that TSPs were offering heavy discounts with respect to the ceiling tariffs for DLCs prescribed through the TTO, 1999. However this discounting on tariff for DLCs was available only in those areas where the economic activity was high and competition was vigorous. In the geographical regions where alternate telecom networks could not be set-up, the tariff for

DLCs continued to remain at the level of ceiling tariffs. The Authority took note of the fact that with increase in the demand of DLCs and advancements in transmission technologies, per unit (in bandwidth terms) cost of providing DLCs had reduced considerably. In this background, the Authority undertook a consultation process and prescribed cost based ceiling tariffs through the TTO (36th Amendment), 2005 dated 21.04.2005. The ceiling tariffs of DLCs (Placed as **Annexure-I**) prescribed through the amended Order were significantly lower than the ceiling tariffs of equivalent capacity prescribed in 1999. The main features of the amended Order are as below:

(i) **Tariff for Trunk (long distance) Segment:** Ceiling tariffs were fixed for DLCs with 64 Kbps, 128 Kbps, 256 Kbps, E1 (2Mbps), DS-3 (45 Mbps) and STM-1 (155 Mbps) capacity. The tariff for DLCs above 256 Kbps and below 2 Mbps capacity was forborne. Ceiling tariffs were based on a 'bottom-up fully allocated cost' approach, using costs of disaggregated network elements submitted by the TSPs. Similar to TTO, 1999, ceiling tariffs were prescribed for various distances[5] in a distance interval of 5 km beginning from 5 km to 500 km (apart from more than 500 km).

(ii) **Chargeable distance:** The calculation of chargeable distance was done by multiplying the radial distance by a factor not exceeding 1.25.

(iii) **Tariff for intermediate distance:** on pro-rata basis

(iv) **Local leads or end links charges:** The ceiling tariff prescribed for trunk segment was made applicable for local leads. In case such leasing was not possible through spare capacity, it was to be provided on 'Rent and Guarantee' (R&G) terms or on the basis of 'Contribution' of total capital cost.

[5] For bandwidth capacities of DS3 and STM-1, the ceiling tariffs were prescribed for various distances in a distance interval of 5 Km beginning from 50 Km to 500 Km (apart from less than 50 km).

(v) **Discounts:** Discounts, if offered on the ceiling tariffs, should be transparent and non-discriminatory based on a laid down criteria and subject to reporting requirement.

(vi) **Mandatory provision of leased circuits:** Leased circuits must be provided wherever capacity is available, and when such capacity is not available, on 'Rent and Guarantee' basis, special construction or contribution basis.

2.18. Through the Telecommunication Tariff (38th Amendment) Order, 2005 (hereinafter referred to as TTO (38th Amendment), 2005) dated 02.06.2005, separate ceiling tariffs for circuits of capacity less than 2 Mbps provided on Managed Leased Line Network (MLLN) technology utilizing V-MUX and Transit Stations were specified. The TSPs use MLLN technology to offer DLCs with improved quality of service (QoS), availability and reliability.

2.19. As on date the ceiling tariffs for DLCs prescribed through the TTO (36th Amendment), 2005 and TTO (38th Amendment), 2005 are in force.

(4) Further Liberalization of NLD Licenses in the year 2006

2.20. With an aim to facilitate the growth of the IT and ITES sectors in the country, the Government further liberalized the NLD segment w.e.f. 01.01.2006. As per the new licensing regime, the 'Entry Fee' for new NLD licences was reduced to Rs. 2.5 crores from the existing level of Rs. 100 crore. The annual licence fee for the NLD licences was reduced to 6% of AGR from the existing level of 15% of AGR. The mandatory roll-out obligation of setting up of a POP in each long distance charging area (LDCA) was waived for both existing and new NLD licenses. Earlier, the minimum net-worth and paid-up capital for NLD licences were Rs. 2500 crore and Rs. 250 crore respectively. These requirements were brought down to the level of Rs. 2.5 crore. The IP-II and IP-VPN licences were withdrawn. The existing IP-II/ IP-VPN licensees were allowed to migrate to NLD/ILD service licence.

2.21. Earlier, the NLD service providers were not allowed to access the subscriber directly for provision of leased circuits/ closed user groups. However, in the new licensing regime, this restriction was done away with and the NLD service provider were allowed to access the subscribers directly for provision of leased circuits/ closed user groups i.e. they can provide last mile connectivity.

2.22. In consequence of the liberalized licensing regime for NLD services, 16 new players entered into NLD market between the year 2006 to 2007. As the NLDOs could now access the subscribers directly for provision of leased circuits/closed user groups, many NLDOs built not only long distance (trunk) transmission infrastructure but also the local area networks in order to serve their customers directly. As a result, a significant competitive activity was witnessed in the retail market of the DLCs which drove the prices further downwards. The new breed of the players started offering MPLS-VPN and a host of customized services viz. provision of service level agreements (SLAs), class of service (CoS), bandwidth on demand, managed services etc. as per the requirement of the customers. The increase in customer focus of the TSPs and reduction in tariffs for DLCs owing to increased competition fuelled the demand of DLCs in the country particularly amongst the enterprises in the field of IT, ITES and financial services.

(5) A regulatory framework for provision of DLCs was laid down in the year 2007.

2.23. In the year 2007, the Authority observed that the new operators in the telecommunication services market generally found it difficult to compete in DLC market because of non-availability of parts of DLC, specially the access part. With a view to ensure that the market functions effectively, the Authority issued the Domestic Leased Circuits Regulations, 2007 dated 14.09.2007. These Regulations provide a framework for provision of DLC (trunk segment/ local lead) in a transparent, predictable, reasonable and non-discriminatory manner. The Regulations also provide for the procedure

relating to provision of DLC (or a local lead) by a specified service provider[6] to another specified service provider who in turn would use it for providing leased circuits to the customers, the obligation of the provider of the service/ specified service provider to reply within a specified timeframe about his ability to provide DLC and maintenance of records in case the provider is unable to provide DLC or local lead. Through these Regulations, the Authority has imposed an obligation on all service providers who have the capacity of copper, fiber or wireless, and who have been allowed under the licence to provide DLC, to share it with other service providers.

(6) Present Market for DLCs in India

2.24. As on date, apart from 7 to 10 ASPs, which are present in each licensed service area (LSA), there are 31 licensed NLDOs who can offer DLCs in the entire country to the end users. A list of NLD licensees[7] in the country as on 22.02.2012 is placed as **Annexure-II**. Most of the large players in the NLD market such as Bharti Airtel Ltd, Bharat Sanchar Nigam Limited, Reliance Communication Limited, Tata Teleservices Ltd are also major ASPs. These NLDOs have built their long distance transmission infrastructure primarily for carrying the inter-circle voice traffic generated by the access segment. Further, being ASPs themselves, they have a presence in the local lead market also and, therefore, generally they do not have to depend upon other ASPs for provision of local leads. As a natural consequence, the vertically integrated operators (viz. the TSPs which are present in both NLD and access service segment) enjoy a competitive advantage in the DLC market. Such players command about 80% (in terms of revenue) of the DLC market in the country.

2.25. The telecommunication services market in India is witnessing a phenomenal shift in the consumer choices. While the voice telephony market is maturing, the data market has seen an unprecedented growth in the recent past. The

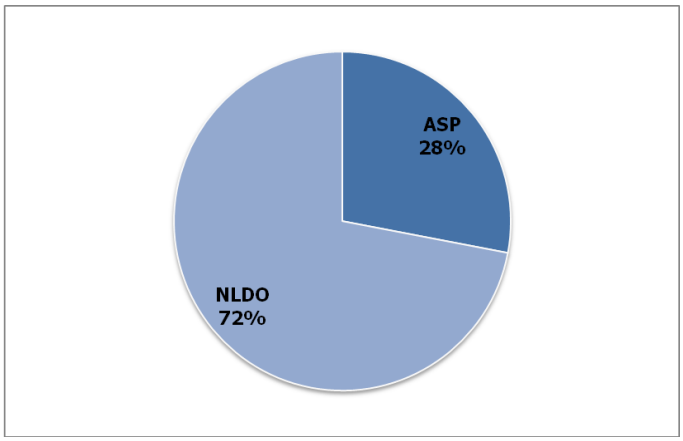
[6] A 'specified service provider' means a service provider who has been allowed under the terms and conditions of its licence to access the subscribers directly for provision of DLC.

[7] Source: DoT (http://www.dot.gov.in/sites/default/files/List%20of%20NLD%20Service%20Providers.pdf)

companies, particularly the knowledge intensive industries are churning out a burgeoning volume of transactional data about their customers, suppliers, and operations. These companies need to transfer trillions of bytes of data amongst their offices for its efficient use. Such a steep growth in the data transfer by the consumers requires an adequately strong transmission infrastructure in the country. In order to cater to such huge data transfer, many TSPs in the country are in the process of building and upgrading their transmission infrastructure. However, given the investment intensive nature of such infrastructure, the high growth has been witnessed only on those routes on which economic activity is very high. As a result, the supply and demand of transmission bandwidth have not been uniform across the country. In pockets like Assam, North East and Jammu & Kashmir, the supply lags demand. As a result, these geographical regions have the presence of only a few NLDOs and relatively scant transmission infrastructure is available there. Owing to the low competition, the tariffs of the DLCs on such routes and regions are comparatively much higher. It has been observed that, on the routes and areas characterized by low competition, the customers face a tariff at par with the TRAI's ceiling tariffs as the TSPs generally keep their base tariffs for DLCs equal to the ceiling tariffs prescribed by the Authority.

2.26. As per the information submitted by the TSPs, the total revenue earned by TSPs from DLCs was about Rs. 8,000 Crores in F.Y. 2012-13, which is about 3.7% of the Gross Revenue (GR) of the Indian telecom service sector. The revenue from DLCs exhibited 10% y-o-y growth in the F.Y. 2012-13. The following figure depicts the market share (in terms of revenue) of NLDOs and ASPs in the DLC segment:

Figure-2.5: Market Share of NLDOs and ASPs in DLC Segment



2.27. For NLDOs, DLC business accounts for about 24% of their Adjusted Gross Revenue (AGR). On the other hand, for the ASPs, DLC business accounts for about 2% of their AGR.

C- Prevailing Tariffs in the P2P-DLC Market

2.28. Most of the TSPs keep the ceiling tariffs prescribed by TRAI as their base tariffs. They offer price discounts depending on the bandwidth, distance, location, volume of business, period of commitment etc. The price discounts are generally much higher on the dense routes. It has been observed that the price discounts w.r.t. the base tariffs generally increase with the distance and bandwidth. The TSPs offer separate discounts for different location categories viz. Delhi – Mumbai, Metros, big cities, smaller cities. The following table presents maximum discounts offered by the major TSPs on their base tariffs on select routes:

Table 2.1: Maximum Discounts Offered by Major TSPs for P2P-DLCs of 50 km distance on Their Base Tariffs on Select Routes

S. No.	Capacity of P2P-DLC	Max. discount (in %) on base tariff for P2P-DLC of 50 km								
		TSP-1	TSP-2	TSP-3	TSP-4	TSP-5	TSP-6	TSP-7	TSP-8	TSP-9
1	E1 (2 Mbps)	75	10	58	20	-	20	35	67	30
2	DS-3 (45 Mbps)	75	25	-	20	59	35	-	63	35
3	STM-1 (155 Mbps)	80	30	56	25	75	32	55	80	40

Table 2.2: Maximum Discounts Offered by Major TSPs for P2P-DLCs of >500 km distance on Their Base Tariffs on Select Routes

S. No.	Capacity of P2P-DLC	Max. discount (in %) on base tariff for P2P-DLC of >500 km								
		TSP-1	TSP-2	TSP-3	TSP-4	TSP-5	TSP-6	TSP-7	TSP-8	TSP-9
1	E1 (2 Mbps)	75	70	74	40	31	58	88	81	55
2	DS-3 (45 Mbps)	75	72	81	40	53	64	88	86	73
3	STM-1 (155 Mbps)	80	75	85	40	60	74	86	84	75

2.29. The pattern of discounts offered by the TSPs indicate the following facts:

(i) Discounts are not available on all routes.

(ii) Lower distances and lower bandwidths fetch lower discount.

(iii) The discounts offered are generally high on dense routes where both level of consumption (demand) and level of competition (number of active TSPs) are high.

D- Prevailing Tariffs in the MPLS-VPN Market

2.30. While a P2P-DLC is subscribed on the basis of bandwidth and distance, an MPLS-VPN is subscribed solely on the basis of bandwidth. Therefore, the tariff regime prescribed by TRAI through the TTO (36th Amendment), 2005 is not be directly applicable on the MPLS-VPNs. As a result, the tariff for MPLS-VPNs is not presently regulated.

2.31. As discussed before in this chapter, in case an enterprise desires to connect its 'n' number of its offices by connecting every site to every other site using P2P-DLCs of a TSP, it would require n*(n-1)/2 number of P2P-DLCs. On the other hand, it can subscribe a MPLS-VPN by connecting each site with a single link to the network of a TSP which would require only 'n' number of links. Thus in order to connect two offices, a customer would require one P2P-DLC or two MPLS-VPN ports. However, in case the number of offices is 10, the

customer would require 45 P2P-DLC links for full mesh connectivity or 10 number of MPLS-VPN ports.

2.32. For connecting two offices, the customer would have to pay for two MPLS ports, the tariff for which may generally exceed the ceiling tariff for P2P-DLC. However, as the number of customers' offices to be connected increases, the cumulative tariff for MPLS-VPN becomes cheaper than that for the P2P-DLCs.

2.33. The base tariffs offered by the major TSPs for a port of MPLS-VPN has been compared with the ceiling tariff for P2P-DLC prescribed through TTO (36th Amendment), 2005 for the lowest and the highest distance categories in the following table.

Table-2.3: Base Tariffs offered by the major TSPs

Capacity of a port of MPLS-VPN	TRAI's current ceiling tariff for P2P-DLC (in Rs. per annum)		Base Tariff for MPLS-VPN (in Rs. per port per annum)						
	5 kms	>500 kms	TSP-a	TSP-b	TSP-c	TSP-d	TSP-e	TSP-f	TSP-g
64 Kbps	10,207	44,000	34,650	44,256	10,526	63,000	-	-	14,490
256 Kbps	31,640	136,400	97,900	119,789	27,193	178,000	23,996	23,870	41,950
2 Mbps	17,016	850,000	244,000	442,558	145,242	610,000	54,248	127,087	205,332
45 Mbps	666,798*	6,159,000	1,755,600	7,500,000	1,410,426	4,389,000	773,189	1,234,123	2,193,534
155 Mbps	1,787,528*	16,520,000	4,708,000	-	2,804,066	14,922,600	1,194,835	2,453,558	6,016,048

* For DS-3 and STM-1 capacities, the minimum distance band for which ceiling tariff has been prescribed is 50 km.

2.34. The above table depicts the base tariffs of MPLS-VPNs. The TSPs offer further discounts depending upon the volume of business viz. number of ports sought by the customer, period of commitment etc. The following table presents the maximum discounts offered by the major TSPs:

Table 2.4: Max. Discounts Offered by the Major TSPs on MPLS-VPN

S. No.	Capacity of MPLS-VPN port	Maximum discount (in %) offered w.r.t. the base tariff						
		TSP-a	TSP-b	TSP-c	TSP-d	TSP-e	TSP-f	TSP-g
1	64 Kbps	20%	55%	50%	10%	-	-	74%
2	256 Kbps	20%	75%	50%	10%	17%	29%	62%
3	E1 (2 Mbps)	53%	84%	50%	40%	29%	44%	78%
4	DS3 (45 Mbps)	53%	95%	50%	50%	-	70%	80%
5	STM-1 (155 Mbps)	55%	-	50%	50%	46%	67%	84%

E- MPLS-VPN is a fast emerging choice amongst retail customers.

2.35. As per the discussion with the TSPs, the enterprises in the field of information technology (IT), IT enabled services (ITES) and financial services prefer MPLS-VPN over P2P-DLCs particularly for low bandwidth circuits. The following table presents the % share of MPLS-VPNs in the total revenue from DLC business based on the revenue data received from major TSPs.

Table 2.5: Share of MPLS-VPN in total revenue from DLCs for major TSPs

S. No.	Capacity	% Share of Revenue from MPLS-VPNs in total revenue from DLCs for major TSPs
1	Upto 512 kbps	87%
2	>512 kbps and upto 2 Mbps	53%
3	>2 Mbps and upto STM-1	29%
4	>STM-1	8%
5	**Overall**	**30%**

2.36. Evidently, MPLS-VPN is a preferred choice for lower bandwidth circuits (below 2 Mbps) while P2P-DLC is preferred for higher bandwidth circuits.

2.37. Based on the above discussion, it is clear that the DLC market in the country has come a long way since the year 2005 when the tariffs for P2P-DLCs were last specified. Not only the transmission networks have become more efficient and versatile, the demand for DLCs (both P2P-DLC and MPLS-VPN) too has

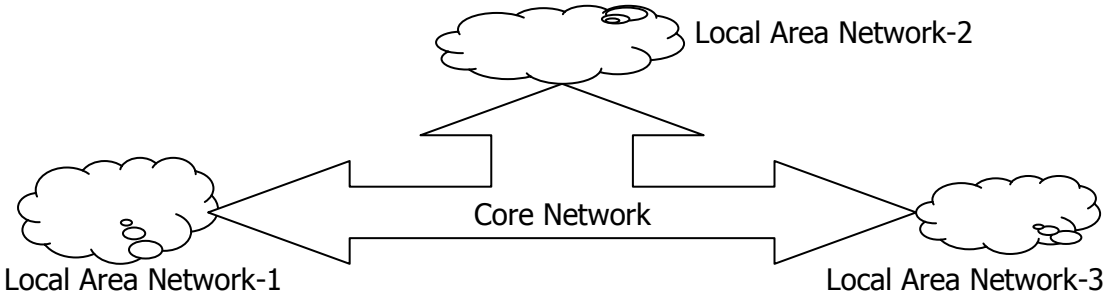
witnessed a significant growth in the intervening period. Together, these phenomenons have helped grow the DLC segment in the country significantly.

Chapter-III
Determination of Ceiling Tariffs for DLCs

3.1. It is understood that TSPs keep upgrading their transmission networks on a regular basis in order to meet demand of their customers. Thus a transmission network of a TSP may be compared with an ever evolving organism which keeps changing its shape and size. Moreover, the topology and capacity of transmission networks differs from TSP to TSP depending upon its stage of growth and business focus. Further, within the network of each TSP, the capacities of the network vary vastly from one geographical area to another depending upon level of economic activity in them. Therefore, designing a transmission network of a typical operator which can closely mimic the actual network of the major players in the DLC market would be a challenging task.

3.2. However, since the endeavor of the Authority, in the present exercise, is to arrive at cost based ceiling tariffs for DLCs while ensuring that the investments in the DLC segment in the country are incentivized, it appears to be appropriate to estimate cost based ceiling tariffs for DLC (for various bandwidth capacities) with the help of a transmission network which is built on a simple topology and is equipped with generally prevalent capacities in its various legs. Typically, the transmission networks of TSPs may be modeled as a two-tier network comprising of a core network and several local area networks such that the core network aggregates the traffic originated by a local area network and transports it to the destination local area network. This architecture is analogous to the road network in the country where national/ state highways (core network) aggregate and carry the road traffic originated by various local roadways (local area networks). The following figure presents a typical two-tier transmission network used for providing DLCs.

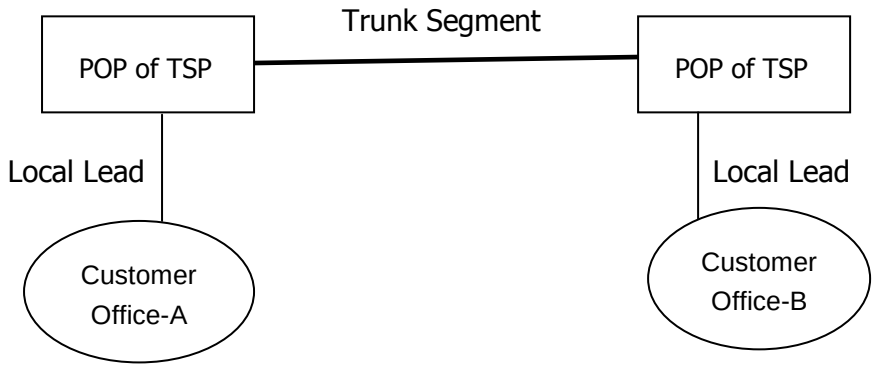
Figure 3.1: Typical Transmission Network Used for Providing DLCs



3.3. It has been observed that many TSPs have also built their transmission network in three (and sometimes more) tiers comprising of core network, aggregation network and local area network. However, keeping in view that a two-tier structure comprising of core network and local area networks would be simpler to model, we may consider the aggregation network, which resembles the core network in its characteristics, to be a part of the core network.

3.4. As discussed in the Chapter-I, for any P2P-DLC between two offices of a customer, local leads are used to connect them with the nearest Point(s) of Presence (POP) of the TSPs. In case the nearest POPs are not same, the two POPs are connected through a trunk segment.

Figure-3.2: Transport of a P2P-DLC over a Transmission Network



3.5. Understandably, the local leads of a DLC would be transported through local area networks and a major part of trunk segment of the DLC would be transported over the core network. As core network aggregates traffic originated from various local area networks, its bandwidth capacity would generally be significantly higher than the bandwidth capacities of local area networks. Thus the bandwidth capacity of the network carrying trunk segment would generally be significantly higher than the network carrying local leads. This raises a question as to whether the ceiling tariffs for trunk segment and local lead should continue to remain equal.

3.6. As outlined before, the market for DLCs in the country has undergone several changes since the year 2005 when the tariffs for P2P-DLCs were last prescribed. Notably, demand and supply of DLCs have increased remarkably and at the same time the transmission technologies have become much more efficient, cost effective and versatile. Consequently, per unit cost of providing DLCs has reduced significantly particularly on the major routes. As a result, the TSPs are able to offer price discounts with respect to the ceiling tariffs prescribed by TRAI on many routes including the routes connecting metros and major commercial cities in the country. However, the benefit of reduction in underlying cost is not being passed-on to the customers for those routes and geographic regions in the country where competitive activity is subdued. As a result, customers seeking DLCs to connect to such areas are forced to pay higher tariff (though within the ceiling tariffs prescribed by the Authority) than those prevalent in the remaining areas. These two phenomenon viz. (i) reduction in per unit cost (in bandwidth terms) of providing DLCs in the country and (ii) vastly different tariffs offered by the TSPs depending upon route and geographic region demand attention.

3.7. Two other issues which also require attention are related to the shift in the consumer choices since the year 2005 when the ceiling tariffs for DLC were last prescribed viz. (i) prevalence of MPLS-VPN in the DLC market and (ii) demand of DLCs of bandwidths higher than STM-1 capacity. Since, neither the

MPLS-VPN nor the bandwidth capacities of P2P-DLC higher than STM-1 have been covered in the TTO (36th Amendment), 2005, this review exercise presents an opportunity to explore whether these need to be brought under tariff regulations.

3.8. Through the present exercise, the Authority is exploring to review the following dimensions of the tariff framework of DLCs:

(i) Appropriateness of the cost basis and methodology used to estimate ceiling tariff for DLCs in TTO (36th Amendment), 2005 to meet the needs of today's DLC market
(ii) Need of separate ceiling tariffs for different elements of DLCs viz. trunk segment and local lead
(iii) Need for separate ceiling tariffs for DLCs depending upon geographical region
(iv) Need for bringing MPLS-VPN under tariff regulation and relevance of separate ceiling tariffs for MLLN based DLCs

3.9. The salient features of the costing exercise conducted for TTO (36th Amendment), 2005 are as below:

(i) Estimation of ceiling tariffs was carried out on the basis of bottom-up methodology using fully-allocated-cost of setting up a new OFC system.
(ii) The capital cost items were divided into three categories viz. (a) Fixed Cost, (b) Semi-variable Cost and (c) Variable Cost.
(iii) STM-4 system was used as a benchmark capacity to arrive at the cost of a DLC of DS3 (45 Mbps) and STM-1 (155 Mbps) capacities.
(iv) STM-1 system was used as a benchmark capacity to arrive at the cost of a DLC of 2 Mbps and below. For DLCs of less than 2 Mbps capacity, cost of 30-channel mux/demux was also included.
(v) Annual operating expenditure (OPEX) was considered to be 10% of capital cost for the three categories mentioned above.

(vi) Annual capital expenditure (CAPEX) was computed on the basis of Return on Capital Employed (ROCE) @ 13.93% and annual depreciation (based on useful life of equipment and Optical fiber cable separately) for the three categories of capital costs.

(vii) Variable cost was amortized over 1.5 systems. Assuming that some of the OFCs deployed in the transmission networks have two (or more) lit fiber pairs while the remaining OFCs have only one lit fiber pair. The average of which was taken as 1.5.

(viii) The proportion of bituminous soil and soft soil was considered to be 15:85.

(ix) While pricing the individual circuits, i.e. 64 kbps, E-1, DS-3, STM-1, the following capacity utilizations and factors of use of the benchmark systems viz. STM-1 or STM-4 were considered:

Table 3.1: % capacity utilizations and factor of use of the benchmark system

S. No.	Bandwidth Capacity of P2P-DLC	Benchmark Capacity of OFC System used for Derivation of cost of the DLC	% Capacity utilization		Factor of use* (applied to derive cost per circuit)
			of variable cost items	of fixed cost and semi-variable cost items	
1	STM1 (155 Mbps)	STM-4	40%	40%	4
2	DS-3 (45 Mbps)	STM-4	35%	35%	12
3	E1 (2 Mbps)	STM-1	50%	50%	63
4	64 Kbps	STM-1#	50%	50%	63 *30

*Factor of use = No. of circuits per benchmark OFC system

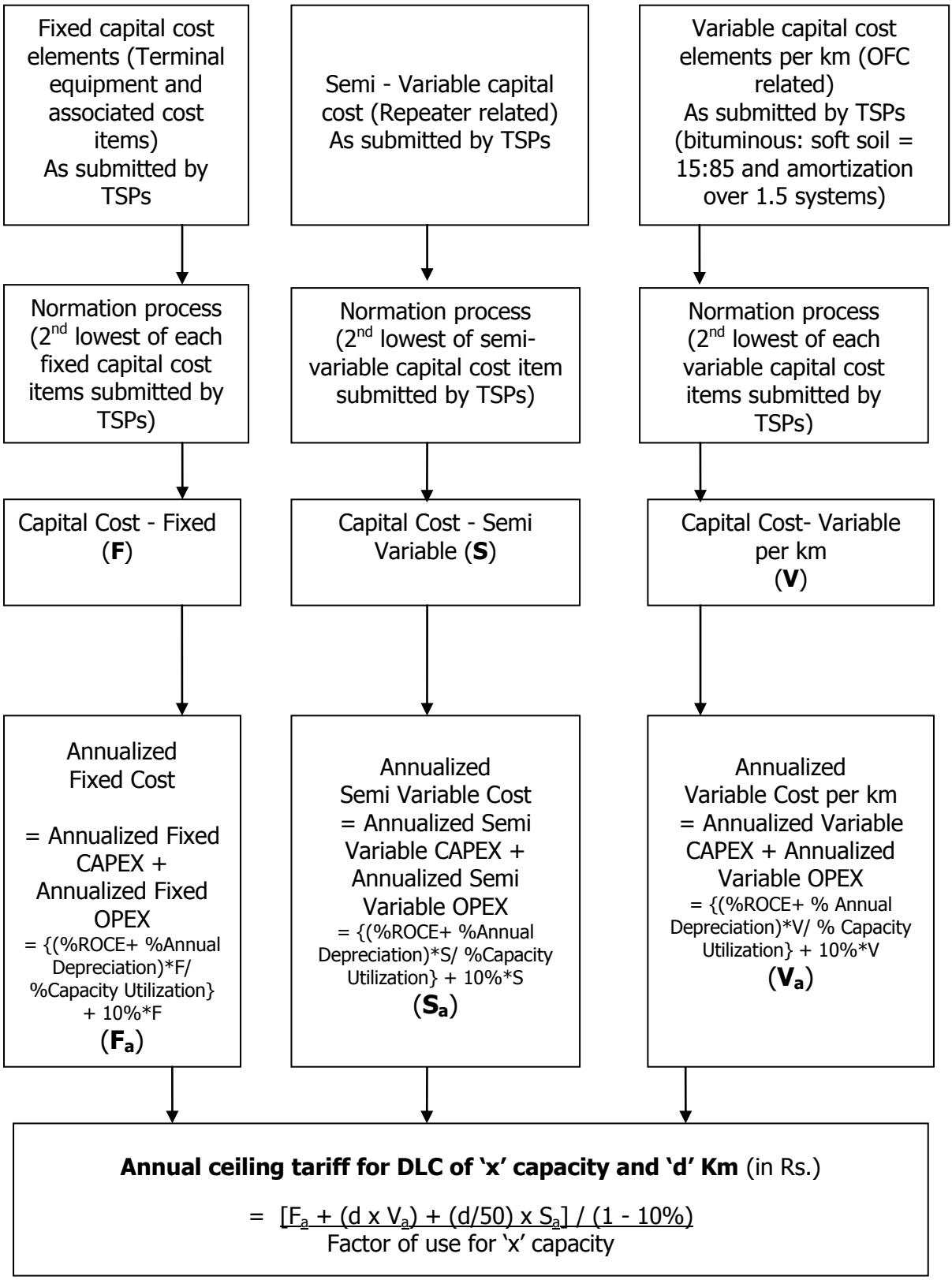
Additional equipment for stepping down from E1 to N*64 kbps for which 40% capacity utilization of variable cost items was considered.

(x) License fee of 10% was considered.

(xi) In order to derive the cost of a DLC of particular bandwidth capacity, the total cost of the OFC system was divided by the 'factor of use' of that capacity.

3.10. The following flow-chart summarizes the steps taken in estimation of ceiling tariffs for DLCs in the last tariff exercise:

Figure- 3.3: Flow Chart of Cost Based Model Used for Deriving Ceiling Tariffs in TTO (36th Amendment), 2005



3.11. On the basis of afore-mentioned cost model, ceiling tariffs for trunk segment of DLCs of 64 kbps, 128 kbps, 256 kbps, E1, DS3 and STM-1 capacities were prescribed for various distances from 5 km to 500 km (apart from more than 500 km) in the distance interval of 5 km through the TTO (36th Amendment), 2005. The ceiling tariffs prescribed for trunk segment were made applicable to local leads also.

Issues for Consultation:

Q1: Should TRAI continue to use the bottom-up fully allocated cost method for computation of cost-based ceiling tariffs for point-to-point DLCs (P2P-DLCs)?

Q2: In case your response to the Q1 is in the affirmative, what values of the following items should be used for estimation of ceiling tariffs for P2P-DLCs:

(i) Return on Capital Employed (ROCE)

(ii) Useful lives of transmission equipment and Optical Fiber Cable separately

(iii) Average no. of fiber pairs lit in OFC in trunk segment and local lead segment separately

(iv) Utilization factor of OFC system in trunk segment and local lead segment separately.

Q3: In case your response to the Q1 is in the negative, what should be the alternative approach for determining tariffs for P2P-DLCs of various bandwidth capacities? Please support your view with a detailed methodology along with data and assumptions, if any.

Q4: In your opinion, what are the bandwidth capacities of P2P-DLCs for which ceiling tariffs need to be prescribed?

Q5: In your opinion, is there a need for prescribing separate ceiling tariffs for local lead and trunk segment?

Q6: In your opinion, is there a need for prescribing separate ceiling tariffs for remote and hilly areas?

Q7: In your opinion, what are the distances of

(i) trunk segment and

(ii) local lead segment (separately)

of P2P-DLCs for which ceiling tariffs need to be prescribed?

Q8: In your opinion, is the distance interval of 5 km still relevant for prescribing distance-based ceiling tariffs for P2P-DLCs?

Q9: In case your response to the Q8 is in the negative, what distance interval should be used for prescribing distance-based ceiling tariffs for P2P-DLCs?

3.12. In the costing exercise conducted in the year 2005, STM-1 was considered as the equipped capacity of OFC for determining ceiling tariff for DLCs of capacities up-to 2 Mbps. On the other hand, STM-4 was considered as the equipped capacity of OFC for determining ceiling tariff for DLCs of DS3 (45 Mbps) and STM-1 (155 Mbps) capacities. It has been observed that the equipped capacity of the trunk segment of P2P-DLC has increased many folds. In the present day network of major TSPs, who have created long distance transmission infrastructure, equipped capacity across the core network is in excess of 10 Gbps. The equipped capacity of the local area network is generally somewhat lower. The increase in bandwidth capacity of transmission networks may be largely attributed to the advancement in the transmission technologies viz. emergence of wavelength division multiplexing (WDM) technology and increased demand from access market and knowledge based industries.

Issue for Consultation:

Q10: What equipped capacities of trunk segment and local lead of P2P-DLC should be used for computation of ceiling tariffs of various bandwidth capacities?

3.13. As already discussed, the tariff ceilings prescribed by TRAI for P2P-DLCs are not applicable to the VPNs because the VPNs are not provisioned on the basis of distances. As a result, the tariffs for VPNs are not under tariff regulation presently. MPLS-VPN, however, is a fast emerging choice among retail customers owing to the fact that it is more cost effective, scalable and allows provision of service level agreements (SLAs), class of service (CoS), bandwidth on demand etc. As per the information provided by the TSPs, MPLS-VPN contributes nearly 30% of revenue from DLC market. The ubiquitous use of VPNs by enterprise customers across the country raises a question as to whether the tariff for VPNs needs to be regulated.

Issues for Consultation:

Q11: Should VPNs such as MPLS-VPNs also be brought under tariff regulations for DLC?

Q12: In case your response to Q11 is in the affirmative, what method should be used for computation of cost based ceiling tariffs for VPNs?

3.14. Through the TTO (38th Amendment), 2005 dated 02.06.2005, separate ceiling tariffs for circuits of capacity less than 2 Mbps provided on Managed Leased Line Network (MLLN) technology utilizing V-MUX and Transit Stations were specified. However, with the emergence of MPLS-VPN and a host of Ethernet based transport technologies, which can be effectively operated, maintained and managed centrally, separate tariff regime for MLLN based DLCs appears to have lost its relevance.

Issues for Consultation:

Q13: In your opinion, is there still a need for prescribing separate ceiling tariffs for DLCs which are provided on Managed Leased Line Network (MLLN) Technology?

Q14: Is there any other relevant issue related to tariff for DLCs which the Authority should keep in mind while carrying out the present review exercise?

Chapter-V
Issues for Consultation

It may please be noted that answers/ comments to the issues given below should be supported with justification. The stakeholders may also comment on any other issues related to the tariff of DLCs, along with all necessary details.

Q1: Should TRAI continue to use the bottom-up fully allocated cost method for computation of cost-based ceiling tariffs for point-to-point DLCs (P2P-DLCs)?

Q2: In case your response to the Q1 is in the affirmative, what values of the following items should be used for estimation of ceiling tariffs for P2P-DLCs:

(i) Return on Capital Employed (ROCE)

(ii) Useful lives of transmission equipment and Optical Fiber Cable (OFC) separately

(iii) Average no. of fiber pairs lit in OFC in trunk segment and local lead segment separately

(iv) Utilization factor of OFC system in trunk segment and local lead segment separately?

Q3: In case your response to the Q1 is in the negative, what should be the alternative approach for determining tariffs for P2P-DLCs of various bandwidth capacities? Please support your view with a detailed methodology along with supporting data and assumptions, if any.

Q4: In your opinion, what are the bandwidth capacities of P2P-DLCs for which ceiling tariffs need to be prescribed?

Q5: In your opinion, is there a need for prescribing separate ceiling tariffs for local lead and trunk segment?

Q6: In your opinion, is there a need for prescribing separate ceiling tariffs for remote and hilly areas?

Q7: In your opinion, what are the distances of
(i) trunk segment and
(ii) local lead segment (separately)
of P2P-DLCs for which ceiling tariffs need to be prescribed?

Q8: In your opinion, is the distance interval of 5 km still relevant for prescribing distance-based ceiling tariffs for P2P-DLCs?

Q9: In case your response to the Q8 is in the negative, what distance interval should be used for prescribing distance-based ceiling tariffs for P2P-DLCs?

Q10: What equipped capacities of trunk segment and local lead of P2P-DLC should be used for computation of ceiling tariffs of various bandwidth capacities?

Q11: Should VPNs such as MPLS-VPNs also be brought under tariff regulations for DLC?

Q12: In case your response to Q11 is in the affirmative, what method should be used for computation of cost based ceiling tariffs for VPNs?

Q13: In your opinion, is there still a need for prescribing separate ceiling tariffs for DLCs which are provided on Managed Leased Line Network (MLLN) Technology?

Q14: Is there any other relevant issue related to tariff for DLCs which the Authority should keep in mind while carrying out the present review exercise?

List of Acronyms

S. No.	Acronym	Expansion
1	AGR	Adjusted Gross Revenue
2	ASP	Access Service Provider
3	BPO	Business Process Outsourcing
4	BSO	Basic Service Operator
5	CMTS	Cellular Mobile Telephony Service
6	CoS	Class of Service
7	CP	Consultation Paper
8	DLC	Domestic Leased Circuit
9	DoT	Department of Telecommunications
10	DS3	Digital Signal 3
11	E-1	E-Carrier 1
12	Gbps	Gigabits Per Second
13	GR	Gross Revenue
14	IP	Internet Protocol
15	ISD	International Subscriber Dialing
16	ITES	Information Technology Enabled Service
17	ITU	International Telecommunication Union
18	Kbps	Kilobits Per Second
19	LDCA	Long Distance Charging Area
20	LSA	Licenced Service Area
21	Mbps	Megabytes Per Second
22	MLLN	Managed Leased Line Network
23	MPLS	Multi Protocol Label Switching
24	NLD	National Long Distance
25	NLDO	National Long Distance Operator
26	NTP	New Telecom Policy
27	OFC	Optical Fibre Cable
28	OPEX	Operating Expenditure
29	OSI	Open System Interconnection
30	P2P-DLC	Point to Point – Domestic Leased Circuit
31	POP	Point of Presence
32	QoS	Quality of Service

33	R&G	Rent & Guarantee
34	ROCE	Return on Capital Employed
35	SLA	Service Level Agreement
36	STD	Subscriber Trunk Dialing
37	STM	Synchronous Transport Module
38	TSP	Telecom Service Provider
39	TTO	Telecommunication Tariff Order
40	UASL	Universal Access Service Licence
41	UL	Unified Licence
42	V-MUX	Versatile Multiplexer
43	VPN	Virtual Private Network
44	WDM	Wavelength Division Multiplexing
45	Y-o-Y	Year-on-Year

Annexure-I

Ceiling Tariffs Prescribed through the TTO (36th Amendment), 2005 dated 21.04.2005

S. No.	Distance (in km)	Ceiling tariff per annum (in Rs.)					
		64 Kbps Circuit	128 Kbps Circuit	256 Kbps Circuit	2 Mbps Circuit	45 Mbps Circuit	STM-1 Circuit
1	5	10,207	18,372	31,640	17,016	6,66,798	17,87,528
2	10	10,533	18,959	32,651	25,180		
3	15	10,859	19,546	33,662	33,344		
4	20	11,185	20,133	34,673	41,509		
5	25	11,511	20,720	35,684	49,673		
6	30	11,837	21,307	36,695	57,837		
7	35	12,163	21,894	37,706	66,001		
8	40	12,489	22,481	38,717	74,165		
9	45	12,815	23,068	39,728	82,329		
10	50	13,214	23,785	40,964	92,667	7,09,301	19,01,152
11	55	13,540	24,372	41,975	1,00,831	7,66,738	20,55,245
12	60	13,866	24,959	42,986	1,08,995	8,24,176	22,09,337
13	65	14,192	25,546	43,997	1,17,159	8,81,613	23,63,430
14	70	14,519	26,133	45,008	1,25,324	9,39,050	25,17,523
15	75	14,845	26,720	46,019	1,33,488	9,96,488	26,71,615
16	80	15,171	27,307	47,029	1,41,652	10,53,925	28,25,708
17	85	15,497	27,894	48,040	1,49,816	11,11,362	29,79,801
18	90	15,823	28,481	49,051	1,57,980	11,68,800	31,33,893
19	95	16,149	29,069	50,062	1,66,144	12,26,237	32,87,986
20	100	16,548	29,786	51,298	1,76,482	13,14,690	35,24,884
21	105	16,874	30,373	52,309	1,84,646	13,72,128	36,78,977
22	110	17,200	30,960	53,320	1,92,810	14,29,565	38,33,069
23	115	17,526	31,547	54,331	2,00,975	14,87,003	39,87,162
24	120	17,852	32,134	55,342	2,09,139	15,44,440	41,41,255
25	125	18,178	32,721	56,353	2,17,303	16,01,877	42,95,347
26	130	18,504	33,308	57,364	2,25,467	16,59,315	44,49,440
27	135	18,831	33,895	58,375	2,33,631	17,16,752	46,03,533
28	140	19,157	34,482	59,386	2,41,795	17,74,189	47,57,625
29	145	19,483	35,069	60,397	2,49,959	18,31,627	49,11,718
30	150	19,881	35,787	61,632	2,60,297	19,20,080	51,48,616
31	155	20,208	36,374	62,643	2,68,461	19,77,517	53,02,709
32	160	20,534	36,961	63,654	2,76,625	20,34,955	54,56,801
33	165	20,860	37,548	64,665	2,84,790	20,92,392	56,10,894
34	170	21,186	38,135	65,676	2,92,954	21,49,830	57,64,987
35	175	21,512	38,722	66,687	3,01,118	22,07,267	59,19,079
36	180	21,838	39,309	67,698	3,09,282	22,64,704	60,73,172
37	185	22,164	39,896	68,709	3,17,446	23,22,142	62,27,265
38	190	22,490	40,483	69,720	3,25,610	23,79,579	63,81,357
39	195	22,817	41,070	70,731	3,33,774	24,37,016	65,35,450

S. No.	Distance (in km)	Ceiling tariff per annum (in Rs.)					
		64 Kbps Circuit	128 Kbps Circuit	256 Kbps Circuit	2 Mbps Circuit	45 Mbps Circuit	STM-1 Circuit
40	200	23,215	41,787	71,967	3,44,112	25,25,470	67,72,348
41	205	23,541	42,374	72,978	3,52,276	25,82,907	69,26,441
42	210	23,867	42,961	73,989	3,60,440	26,40,344	70,80,533
43	215	24,193	43,548	75,000	3,68,605	26,97,782	72,34,626
44	220	24,520	44,135	76,011	3,76,769	27,55,219	73,88,719
45	225	24,846	44,722	77,022	3,84,933	28,12,657	75,42,811
46	230	25,172	45,309	78,033	3,93,097	28,70,094	76,96,904
47	235	25,498	45,896	79,044	4,01,261	29,27,531	78,50,996
48	240	25,824	46,483	80,055	4,09,425	29,84,969	80,05,089
49	245	26,150	47,070	81,066	4,17,590	30,42,406	81,59,182
50	250	26,549	47,788	82,301	4,27,927	31,30,859	83,96,080
51	255	26,875	48,375	83,312	4,36,091	31,88,297	85,50,173
52	260	27,201	48,962	84,323	4,44,256	32,45,734	87,04,265
53	265	27,527	49,549	85,334	4,52,420	33,03,171	88,58,358
54	270	27,853	50,136	86,345	4,60,584	33,60,609	90,12,451
55	275	28,179	50,723	87,356	4,68,748	34,18,046	91,66,543
56	280	28,505	51,310	88,367	4,76,912	34,75,484	93,20,636
57	285	28,832	51,897	89,378	4,85,076	35,32,921	94,74,728
58	290	29,158	52,484	90,389	4,93,240	35,90,358	96,28,821
59	295	29,484	53,071	91,400	5,01,405	36,47,796	97,82,914
60	300	29,882	53,788	92,636	5,11,742	37,36,249	1,00,19,812
61	305	30,209	54,375	93,647	5,19,906	37,93,686	1,01,73,905
62	310	30,535	54,962	94,657	5,28,071	38,51,124	1,03,27,997
63	315	30,861	55,549	95,668	5,36,235	39,08,561	1,04,82,090
64	320	31,187	56,136	96,679	5,44,399	39,65,998	1,06,36,182
65	325	31,513	56,723	97,690	5,52,563	40,23,436	1,07,90,275
66	330	31,839	57,310	98,701	5,60,727	40,80,873	1,09,44,368
67	335	32,165	57,898	99,712	5,68,891	41,38,311	1,10,98,460
68	340	32,491	58,485	1,00,723	5,77,055	41,95,748	1,12,52,553
69	345	32,818	59,072	1,01,734	5,85,220	42,53,185	1,14,06,646
70	350	33,216	59,789	1,02,970	5,95,557	43,41,639	1,16,43,544
71	355	33,542	60,376	1,03,981	6,03,721	43,99,076	1,17,97,637
72	360	33,868	60,963	1,04,992	6,11,886	44,56,513	1,19,51,729
73	365	34,194	61,550	1,06,003	6,20,050	45,13,951	1,21,05,822
74	370	34,521	62,137	1,07,014	6,28,214	45,71,388	1,22,59,914
75	375	34,847	62,724	1,08,025	6,36,378	46,28,825	1,24,14,007
76	380	35,173	63,311	1,09,036	6,44,542	46,86,263	1,25,68,100
77	385	35,499	63,898	1,10,047	6,52,706	47,43,700	1,27,22,192
78	390	35,825	64,485	1,11,058	6,60,870	48,01,138	1,28,76,285
79	395	36,151	65,072	1,12,069	6,69,035	48,58,575	1,30,30,378
80	400	36,550	65,790	1,13,304	6,79,372	49,47,028	1,32,67,276
81	405	36,876	66,377	1,14,315	6,87,536	50,04,466	1,34,21,368
82	410	37,202	66,964	1,15,326	6,95,701	50,61,903	1,35,75,461

S. No.	Distance (in km)	Ceiling tariff per annum (in Rs.)					
		64 Kbps Circuit	128 Kbps Circuit	256 Kbps Circuit	2 Mbps Circuit	45 Mbps Circuit	STM-1 Circuit
83	415	37,528	67,551	1,16,337	7,03,865	51,19,340	1,37,29,554
84	420	37,854	68,138	1,17,348	7,12,029	51,76,778	1,38,83,646
85	425	38,180	68,725	1,18,359	7,20,193	52,34,215	1,40,37,739
86	430	38,507	69,312	1,19,370	7,28,357	52,91,652	1,41,91,832
87	435	38,833	69,899	1,20,381	7,36,521	53,49,090	1,43,45,924
88	440	39,159	70,486	1,21,392	7,44,686	54,06,527	1,45,00,017
89	445	39,485	71,073	1,22,403	7,52,850	54,63,965	1,46,54,110
90	450	39,883	71,790	1,23,639	7,63,187	55,52,418	1,48,91,008
91	455	40,210	72,377	1,24,650	7,71,352	56,09,855	1,50,45,100
92	460	40,536	72,964	1,25,661	7,79,516	56,67,293	1,51,99,193
93	465	40,862	73,551	1,26,672	7,87,680	57,24,730	1,53,53,286
94	470	41,188	74,138	1,27,683	7,95,844	57,82,167	1,55,07,378
95	475	41,514	74,725	1,28,694	8,04,008	58,39,605	1,56,61,471
96	480	41,840	75,312	1,29,705	8,12,172	58,97,042	1,58,15,564
97	485	42,166	75,899	1,30,716	8,20,336	59,54,479	1,59,69,656
98	490	42,492	76,486	1,31,726	8,28,501	60,11,917	1,61,23,749
99	495	42,819	77,073	1,32,737	8,36,665	60,69,354	1,62,77,842
100	500	43,217	77,791	1,33,973	8,47,002	61,57,807	1,65,14,740
101	>500	44,000	79,200	1,36,400	8,50,000	61,59,000	1,65,20,000

Annexure-II

LIST OF NLD LICENSEES
As on 22.02.2012

Sl. No.	Name of NLD Licensee	Effective Date of License
1	2	3
1.	M/s Bharat Sanchar Nigam Ltd.	Incumbent Operator
2.	M/s Bharti Airtel Ltd.	29.11.2001
3.	M/s Reliance Communications Limited	28.01.2002
4.	M/s Videsh Sanchar Nigam Ltd. (Tata Communications Ltd.)	08.02.2002
5.	M/s Mahanagar Telephone Nigam Ltd.	10.05.2006
6.	M/s Power Grid Corpn. Of India Ltd.	05.07.2006
7.	M/s RailTel Corpn. Of India Ltd.	07.07.2006
8.	M/S HCL Infinet Ltd.	11.07.2006
9.	M/s i2i Enterprises Ltd. (BT Global Communications India Pvt. Ltd)	11.07.2006
10.	M/s Tulip IT Services Ltd. (M/s Tulip Telecom Ltd.)	08.08.2006
11.	M/s Shippingstop Dot Com (India) Pvt. Ltd.	18.09.2006
12.	M/s AT&T Global Network Services India Pvt. Ltd.	09.10.2006
13.	M/s Vodafone Essar South Ltd.	10.11.2006
14.	M/s Sify Communications Ltd.	21.11.2006
15.	M/s Idea Cellular Ltd.	23.11.2006
16.	M/s Dishnet Wireless Ltd.	13.12.2006
17.	M/s BT Telecom India Pvt. Ltd	20.02.2007 (Surrendered on 02.05.208)
18.	M/s Tata Teleservuces Ltd.	30.07.2007
19.	M/s Spice Communications Ltd.	08.08.2007
20.	M/s Oil India Limited	27.12.2007
21.	M/s Verizon Communications India Private Limited	03.01.2008
22.	M/s Cable & Wireless Networks India Private Limited	15.02.2008
23.	Ms Equant Network Services India Private Limited	20.06.2008
24.	M/s Swan Connect Communications Private Limited	12.08.2008 (Surrendered on date 22.08.2009)
25.	M/s Citicom Networks Private Limited	03.10.2008
26.	M/s Swan Telecom Pvt. Ltd.	06.10.2008
27.	M/s SingTel Global (India) Private Limited	05.03.2009
28.	M/s Datacom Solutions Private Limited	18.03.2009
29.	M/s Unitech Long Distance Communications Services Ltd.	28.04.2009
30.	M/s Pacific Internet India Private Limited	22.01.2010
31.	M/s Hughes Communications India Limited	11.10.2011
32.	M/s Telstra Telecommunications Pvt. Limited	11.10.2011
33.	M/s Infotel Telecom Limited	14.02.2012

Source: DoT (http://www.dot.gov.in/sites/default/files/List%20of%20NLD%20Service%20Providers.pdf)