CONSUMER PROTECTION ASSOCIATION
HIMMATNAGAR
DIST. : SABARKANTHA
GUJARAT

Comments on

Pre-Consultation Paper on Review of Tariff for Domestic leased circuits (DLCs)

Introduction :

On behalf of Consumer Protection Association, Himmatnagar, we appreciate the opportunity to submit our views on the pre-consultation paper issued by the Authority on the review of tariffs for Domestic Leased Circuits (DLCs).

We recognize that DLCs are vital infrastructure for a wide range of sectors including education, healthcare, banking, manufacturing, and digital services. Therefore, the pricing framework of such circuits directly impacts both institutional consumers and the end-users who rely on services delivered through these channels.

Key Consumer-Centric Submissions

1. **Affordability and Fair Access**
    - It is imperative that tariffs for DLCs reflect *reasonable cost-based pricing*, particularly for consumers operating in low-competition or rural areas.

- TRAI should consider implementing **tariff ceilings** or **reference tariffs** in non-competitive markets to prevent overcharging by dominant service providers.

2. **Transparency and Cost Justification**
   - We recommend that service providers be mandated to disclose the **cost components and pricing rationale** for DLCs. This will encourage competitive pricing and enable institutions to make informed choices.
3. **Inclusion of Small and Medium Enterprises (SMEs)**
   - DLC pricing must be structured to ensure **affordability for SMEs and educational institutions**, many of whom rely on leased circuits for secure data exchange and connectivity.
   - Preferential or concessional DLC tariffs may be considered for such socially and economically beneficial use cases.
4. **Promotion of Competition and Infrastructure Sharing**
   - In areas with limited infrastructure, TRAI should encourage **mandatory sharing of passive infrastructure** and backhaul to reduce costs for new entrants, thereby improving consumer choice and pricing.
5. **Grievance Redressal and Standardized Contracts**
   - TRAI may consider issuing **model service-level agreements (SLAs)** and **grievance redressal norms** for DLC services to protect consumer interests, especially in case of downtime or unjustified billing practices.
6. **Periodic Review Based on Technological Evolution**
   - Given the fast-changing telecom ecosystem (e.g., 5G rollout, data-intensive services), we urge that DLC tariffs be

periodically reviewed to reflect the evolving cost structures and ensure continued consumer benefit.

In summary, the regulatory framework for DLC tariffs must uphold the principles of **affordability, fairness, transparency, and accessibility**, with special attention to the needs of **underserved regions and sectors**. We commend TRAI for initiating this pre-consultation and urge the Authority to continue engaging with consumer stakeholders through a structured consultation process.

1. **Development trends and current status of the DLC market in the country :**

Development Trends and Current Status of the Domestic Leased Circuit (DLC) Market in India

1. Evolution and Growth

- DLCs have evolved from legacy copper lines to modern **optical fiber networks** offering high-speed, secure, point-to-point and point-to-multipoint connectivity.
- There is increasing demand from sectors such as **BFSI, IT/ITeS, education, healthcare, retail, and government** for dedicated lines with high uptime.
- Growth in **cloud computing, VPNs, and enterprise connectivity** is fuelling the demand for more scalable and flexible leased circuits.

2. Shift Toward MPLS and Ethernet

- Many service providers now offer **MPLS-based leased lines** and **Ethernet over fiber**, providing more flexible bandwidth options compared to traditional TDM circuits.
- However, some regions—especially **Tier-II, Tier-III cities, and rural areas**—still lack fiber penetration and depend on legacy or costly circuits.

3. Market Players

- Private operators dominate urban and industrial markets, while **PSUs often serve as sole providers in rural/remote areas**, often with outdated infrastructure.

4. Tariff and Competition Issues

- In **competitive urban areas**, pricing is more dynamic, with negotiated SLAs and bundled packages.
- In **low-competition areas**, leased circuit tariffs are significantly higher, and consumers have limited bargaining power or alternatives.
- There's **no uniform benchmark tariff**, and pricing often lacks transparency.

Inputs for the Pre-Consultation Paper for Consumer Benefit

1. Consumer-Centric Tariff Regulation

- Recommend **reference or ceiling tariffs** in low-competition zones.
- Seek **differential pricing guidelines** for rural institutions, SMEs, and public services (e.g., government schools, PHCs).

2. Transparent Tariff Disclosure

- Urge for **mandatory public disclosure** of DLC tariffs and related charges on provider websites.
- Request **standardized service-level agreement (SLA) formats** and performance metrics.

3. Right to Port and Competition Facilitation

- Suggest **infrastructure sharing mandates** to allow new entrants and reduce consumer dependency on monopolistic providers.
- Advocate for **portability of DLCs** across service providers or simpler migration procedures for enterprise customers.

4. Inclusion of Smaller Users

- Recommend **tiered packages or low-bandwidth leased circuits** for small institutions (1–2 Mbps) to make access affordable.
- Ask for **subsidized DLC plans** for educational, rural healthcare, and government welfare schemes.

5. Grievance Redressal Mechanism

- Suggest creating a dedicated **DLC grievance handling mechanism** with timelines and penalties for SLA breaches.
- Mandate **automated downtime compensation policies**.

6. Periodic Cost-Review and Benchmarking

- Recommend TRAI to conduct **biennial cost studies** and **benchmark DLC tariffs** based on network infrastructure costs, demand density, and technology shifts.

7. DLC as Essential Digital Infrastructure

- Urge TRAI to treat DLCs as **essential digital public infrastructure**, especially for **Digital India, e-Governance, and Digital Health Mission** needs.
- Promote **fiber-to-village strategies** using DLC frameworks under BharatNet or other universal service schemes.

2. Effectiveness of the existing tariff framework for Domestic Leased Circuits (DLCs) :

The current tariff framework for DLCs in India is **largely forborne**, meaning there is **no mandatory tariff regulation** except in select cases like BSNL where TRAI continues to exercise oversight. This framework was designed to encourage competition and investment. However, its **effectiveness is mixed**, especially from the consumer standpoint.

Strengths

- **Market-driven tariffs** in competitive urban areas have enabled flexibility and service bundling.
- High-end consumers (MNCs, IT firms) benefit from **customized contracts and SLAs**.
- Tariff forbearance encourages **innovation** in leased line offerings (e.g., MPLS, Ethernet, managed services).

Weaknesses

1. **Lack of Uniformity and Transparency**

- Tariffs are **not published uniformly** or updated regularly across providers.
- Consumers lack clear access to tariff comparisons.

2. **High Prices in Low-Competition Areas**
   - In rural, remote, or monopolistic markets, DLC tariffs are **unregulated and often exploitative**.
   - Public institutions (schools, PHCs, Gram Panchayats) are especially impacted.
3. **Limited Access for Small Users**
   - SMEs, rural institutions, and startups face **entry barriers** due to high cost and bandwidth slabs not suited to their needs.
4. **Weak SLA Enforcement and Grievance Redressal**
   - Existing framework lacks **uniform SLAs, uptime guarantees, or compensation mechanisms**.
   - Consumers have limited avenues for addressing **downtime or service failures**.
5. **No Periodic Review Linked to Cost or Technology**
   - Tariff framework does not account for **falling fiber deployment costs** or bandwidth cost reductions due to 5G, DWDM, or cloud-based optimizations.

II. Suggested Improvements for Consumer Benefit

Area of Concern	Recommended Improvement	Expected Consumer Benefit
Tariff Transparency	Mandate service providers to **publish standard DLC tariffs, breakup of charges, and available bandwidth options** online	Enables informed choice, reduces price discrimination
Tariff Control in Non-Competitive Areas	Introduce **reference/cap tariffs** or cost-based regulation in monopoly/duopoly zones	Prevents overcharging in rural or Tier-III areas
Tiered Bandwidth Options	Create mandatory **low-bandwidth DLC packages (e.g., 1–5 Mbps)** for SMEs and public institutions	Improves affordability and access for small users
SLA Standardization	Enforce **mandatory SLA formats** with uptime guarantees, MTTR, and penalty clauses	Ensures service quality and recourse for consumers
Grievance Mechanism	Establish **dedicated DLC grievance portal** with defined response times and escalation matrix	Empowers consumers to seek redress effectively
Infrastructure Sharing	Promote **mandatory passive infra sharing (ducts, poles)** for DLC deployment in rural areas	Reduces cost, increases provider availability
Periodic Tariff Review	TRAI to conduct **biennial cost studies and reviews** considering technological advancements	Keeps tariff aligned with market reality, avoids legacy cost burdens
Socially Beneficial Use Pricing	Provide **concessional or USOF-backed DLC tariffs** for rural healthcare, schools, and digital governance	Facilitates inclusive digital growth

The existing forbearance-based framework is **beneficial in competitive urban markets** but **ineffective for equitable access and affordability** in rural and underserved regions. A **hybrid approach** with **regulated floor/ceiling tariffs** where necessary, combined with **transparency, grievance redressal, and tiered access**, will significantly enhance consumer welfare in the DLC market.

3. Prevailing tariff structures for DLCs offered by service providers across different technologies, bandwidths and distances.

Usefulness of Prevailing Tariff Structures for DLCs Across Technologies, Bandwidths, and Distances for Consumers :

A. Usefulness for Consumers:

The prevailing tariff structures for Domestic Leased Circuits (DLCs) vary by:

- **Technology** (e.g., copper, fiber, Ethernet, MPLS),
- **Bandwidth slabs** (e.g., 64 kbps to Gbps range), and
- **Distance** (local, intercity, intrastate, interstate).

While this variety **offers flexibility in theory**, it has **limited practical usefulness for average consumers** due to the following issues:

1. Lack of Standardization and Comparability

- Tariffs are **not disclosed transparently** across providers, making comparisons difficult.
- Varying cost structures (e.g., distance-based vs. flat pricing) make it hard for consumers to **assess value-for-money**.

2. Disproportionate Pricing in Remote Areas

- In many rural or Tier-III regions, consumers face **high tariffs** due to lack of competition and longer distances, despite reduced bandwidth needs.
- Some providers still **price based on legacy models** (e.g., per km), which is **outdated** in the era of fiber optics and DWDM.

3. Inaccessibility for Smaller Users

- High minimum bandwidth slabs (e.g., 10 Mbps+) and complex pricing deter **SMEs, rural schools, and health centers** from subscribing.
- No tariff customization or entry-level plans are offered for these users.

4. Technology Discrimination

- Newer technologies (e.g., Ethernet-over-Fiber, IP/MPLS) are often bundled with premium charges, while legacy DSL is cheaper but inferior, forcing consumers to choose between affordability and quality.

B. Type of Regulation Needed for Consumer Benefit

To enhance the **consumer-friendliness** of DLC tariffs, TRAI should consider a **targeted and hybrid regulatory approach** that balances market freedom with consumer protection.

1. Tariff Benchmarks and Ceilings in Non-Competitive Areas

- Define **reference tariffs or ceiling prices** based on cost studies in monopoly/duopoly zones.

- Implement **distance-neutral or slab-based pricing** for better predictability.

2. Mandatory Tariff Disclosure and Comparison Framework

- Require all service providers to **publish standardized tariff charts** for DLCs across:
  - Bandwidth (1 Mbps to 1 Gbps),
  - Technology type (copper, fiber, MPLS),
  - Geographic category (urban/rural/remote),
- Develop a **central tariff comparison portal** hosted by TRAI.

3. Tiered and Social Tariff Packages

- Mandate **affordable DLC plans** for small institutions and essential services (schools, PHCs, MSMEs).
- Consider **Universal Service Obligation Fund (USOF)** subsidies or cross-subsidization models.

4. Standardized SLA and QoS Regulations

- Introduce **uniform SLAs** covering latency, uptime, MTTR (Mean Time to Restore), with automatic compensation clauses.
- Include **SLA transparency and redress norms** in consumer charters.

5. Periodic Cost-Based Tariff Review

- TRAI should conduct **biennial cost audits and tariff reviews**, adjusting ceilings or benchmarks based on:
  - Technology cost changes,
  - Fiber penetration rates,

- Competition levels by region.

6. Infrastructure Sharing and Open Access Regulation

- Enforce **passive infrastructure sharing** (ducts, towers, backhaul) to bring more players and reduce cost duplication.
- Consider **mandated open access models** for last-mile DLC delivery in low-competition zones.

The current DLC tariff structures offer theoretical diversity but fall short on **usability, transparency, and equity** for consumers. Targeted regulation in pricing transparency, competition-sensitive ceilings, and socially beneficial tariff models can bridge this gap and promote **digital inclusion and economic fairness**.

Here is a **comparative table of international regulatory models for Domestic Leased Circuits (or equivalent services)** that TRAI can consider to improve consumer protection and affordability in India:

Comparative Table: International DLC (Leased Line) Regulatory Models

Country/Region	Regulatory Authority	Regulation Model	Key Features	Consumer Benefits
United Kingdom	Ofcom	**Cost-based price control** for BT's legacy leased lines; market-based	- Charge control on low bandwidth circuits (≤1 Gbps)	Prevents overcharging in monopoly zones; improves competition

		for high-speed lines	- Dark fiber access mandated in non-competitive areas	in underserved areas
European Union (EU)	BEREC & National Regulators	**Access regulation + non-discrimination**	- Mandates access to essential facilities - Wholesale pricing obligations for SMPs (Significant Market Power) - Cost accounting rules apply	Fair pricing across EU; cross-border uniformity; protection from dominant firms
United States	FCC	**Forbearance + Targeted Regulation**	- Tariff regulation only in areas with insufficient competition - Rate caps for TDM-based services - Deregulation in competitive markets	Maintains service affordability where competition is low; ensures smooth transition to IP-based networks

Singapore	IMDA	**Reference Interconnect Offers (RIO) + Open Access**	- Regulates Singtel (dominant) for leased lines - Mandated RIOs for transparency - Service level guarantees & QoS parameters enforced	Ensures fair access, SLA compliance, and transparent pricing
Australia	ACMA & ACCC	**Declared Service + Cost-based Access**	- Leased line access declared under telecom law - Wholesale pricing determined by cost model - Fibre access regulated in monopoly backhaul areas	Reduces regional digital divide; competitive retail options
South Africa	ICASA	**Hybrid Model**	- Cost-based regulation for legacy circuits	Supports small operators and improves

			- Promotes infrastructure sharing - Offers price transparency tools	rural connectivity
Malaysia	MCMC	**Access List + Standard Access Obligations**	- Mandated access to leased lines under "Access List" - Quality of Service regulations enforced - Mandatory published pricing for transparency	Makes business-grade connectivity more affordable for SMEs

TRAI can adopt a blended approach:

- Use **reference/interim tariffs** in low-competition zones.
- Mandate **price disclosure and SLA enforcement**.
- Promote **dark fiber access** or **open access models** to enhance competition.
- Extend **USOF subsidies** to DLCs used in education, health, and public institutions.

4. Impact of new technological advancements on the evolving DLC ecosystem and associated tariff considerations :

The evolving **Domestic Leased Circuit (DLC) ecosystem** is being significantly reshaped by new technological advancements such as **SD-WAN**, **fiber densification**, **5G**, **network slicing**, and **cloud interconnects**. These changes have important implications for tariff frameworks and consumer benefits, especially in the enterprise and SME sectors.

Impact of Technological Advancements on the DLC Ecosystem:

1. **Software-Defined WAN (SD-WAN)**:
    - **Impact**: Reduces dependence on expensive leased lines by dynamically routing traffic across multiple paths (including broadband and LTE).
    - **Tariff Implication**: Pushes traditional DLC providers to re-evaluate and lower prices to stay competitive.
    - **Consumer Benefit**: Lower costs, improved performance, and flexibility for enterprises.
2. **Fiber Expansion & Dense Networks**:
    - **Impact**: High-capacity, low-latency links become available even in Tier II/III cities.
    - **Tariff Implication**: Increased competition and capacity allow for volume-based pricing and lower per-Mbps tariffs.
    - **Consumer Benefit**: More affordable high-speed circuits with better uptime for businesses and institutions.
3. **5G & Network Slicing**:
    - **Impact**: Allows DLC-equivalent dedicated bandwidth for specific use-cases over wireless networks.

- **Tariff Implication**: New models for SLA-based mobile leased circuits (wireless DLCs).
- **Consumer Benefit**: Last-mile redundancy, better coverage in rural or hard-to-reach areas without laying fiber.

4. **Cloud Interconnect & Data Center Peering**:
   - **Impact**: Enterprises prefer direct cloud connectivity (e.g., AWS Direct Connect, Azure ExpressRoute) over traditional DLCs.
   - **Tariff Implication**: Tariff models must accommodate pay-as-you-go or usage-tiered pricing.
   - **Consumer Benefit**: Predictable performance and security for cloud workloads with flexible pricing.
5. **AI and Predictive Maintenance**:
   - **Impact**: Automated fault detection improves uptime and service delivery.
   - **Tariff Implication**: Premium services (SLA-backed) could be priced based on guaranteed availability.
   - **Consumer Benefit**: Higher reliability and transparency in service performance.

Tariff Considerations and Consumer Benefits:

Aspect	Tariff Shift	Consumer Benefit
Bandwidth scalability	Dynamic/elastic pricing	Pay only for what you use; scale up during demand peaks
Distance-based to flat-rate	Technology makes distance less relevant	Fair pricing regardless of geography

Aspect	Tariff Shift	Consumer Benefit
SLA-based tariffs	Priority for high-uptime links	Critical sectors (e.g. banking, healthcare) gain reliability
Competition-led tariffs	More players (especially via SD-WAN)	More choice and lower prices for end-users
Bundled services	Cloud + connectivity	Simpler procurement and better integration

How Consumers Can Benefit:

1. **Lower Costs** due to competition, better infrastructure, and virtualized solutions.
2. **Improved Access** to high-speed dedicated connections in underserved or rural areas via 5G or satellite DLC.
3. **More Flexibility** in tariff models (e.g., usage-based, time-of-day discounts).
4. **Better SLAs** and reliability due to AI-driven network management and fiber densification.
5. **Customizable Solutions** for SMEs, startups, and remote offices through SD-WAN and hybrid leased circuits.

5. Disparities in tariffs across different routes and geographical regions

Domestic Leased Circuits (DLCs) in India often suffer from **tariff disparities** across various routes and geographic regions due to multiple structural and commercial reasons. These disparities impact **small**

enterprises, educational institutions, healthcare providers, and **rural consumers**, limiting access to affordable high-quality connectivity.

Key Disparities in DLC Tariffs:

1. Urban vs. Rural Tariffs

- **Observation**: Tariffs in metro and Tier-I cities (e.g., Delhi, Mumbai, Bengaluru) are significantly lower compared to rural or remote regions.
- **Reason**:
    - Higher fiber network penetration and competition in cities.
    - Lack of infrastructure and fewer service providers in rural areas leads to monopoly pricing.
- **Example**: A 10 Mbps DLC may cost ₹3,000/month in Delhi but over ₹8,000/month in a rural area of Jharkhand.

2. Intra-Circle vs. Inter-Circle Routes

- **Observation**: DLCs on **intra-circle** (within same telecom circle) routes are cheaper than **inter-circle** (between two circles) ones.
- **Reason**: Higher infrastructure costs, regulatory charges, and route management complexities for inter-circle routes.
- **Impact**: High cost for institutions and businesses requiring interstate leased lines (e.g., universities with multiple campuses).

3. Route-Specific Premiums (Non-Standard Routes)

- **Observation**: Some "non-standard" or less commercially viable routes attract much higher tariffs.

- **Reason**: Lack of pre-laid fiber, terrain difficulty (e.g., Northeast, hilly or forest areas), and low demand.
- **Example**: DLC costs from Guwahati to Tura (Meghalaya) may be several times higher than Guwahati to Kolkata.

4. Technology-Based Discrimination

- **Observation**: DLCs over Ethernet or fiber tend to be cheaper and more efficient than those over legacy copper or microwave links.
- **Reason**: Operators price newer tech lower in competitive areas, but rural or hilly regions are stuck with outdated and expensive options.
- **Impact**: Consumers in backward regions pay more for lower quality.

5. Lack of Uniform Pricing Benchmark

- **Observation**: No uniform cost-based ceiling or floor tariffs exist.
- **Reason**: Tariffs are often negotiated, confidential, and vary by provider and route.
- **Result**: Larger enterprises get discounts while small users pay standard or inflated rates.

Recommendations to Address Disparities:

Issue	Suggested Regulatory Measure
High rural tariffs	Mandate USOF-supported uniform pricing for essential bandwidth tiers (e.g., 2 Mbps, 10 Mbps)
Inter-circle cost burden	Encourage national backhaul fiber pooling and shared passive infra

Issue	Suggested Regulatory Measure
Route-specific premiums	Identify and subsidize difficult routes via policy support or PPP models
Tariff opacity	Require publication of indicative route-wise DLC tariffs by all operators
Tech disparity	Incentivize fiber and SD-WAN rollout in non-metro regions through licensing reforms

6. Approaches and methodologies adopted by service providers for determining tariffs of DLCs (presently under forbearance).

The service providers typically follow structured methodologies to ensure competitiveness, cost recovery, and alignment with long-term strategic goals. The main **approaches and methodologies** adopted by service providers for determining DLC tariffs include:

1. Cost-Based Pricing

- **Bottom-up approach**: Providers calculate the total cost of setting up and maintaining a DLC (including CAPEX, OPEX, depreciation, and RoI).
- **Cost components** include:
    - Infrastructure (fiber, PoPs, routers, switches)
    - Network management and maintenance
    - Spectrum/license costs (if any)
    - Customer support and service provisioning

2. Market-Based Pricing

- Benchmarks are set based on:
    - **Competition**: Prices of other major providers for similar bandwidth and distance.
    - **Customer Segment**: Bulk users (e.g., enterprises, data centers) may get discounted tariffs.
    - **Bandwidth Demand**: Higher bandwidth users may receive volume discounts.
- Prices vary depending on location (metro vs. rural), service-level agreements (SLAs), and contract duration.

3. Value-Based or Outcome-Based Pricing

- Pricing based on the **perceived value to the customer** rather than just cost.
- Includes:
    - Premium for high uptime and reliability
    - Priority support and dedicated links
    - Custom SLAs (e.g., latency guarantees)

4. Tiered Tariff Models

- Different slabs for different bandwidths (e.g., 2 Mbps, 10 Mbps, 100 Mbps)
- Discounts offered for longer-term contracts (e.g., 1-year vs. 5-year lease)

5. Benchmarking with Global and Domestic Standards

- Some operators benchmark against:

    - Global DLC pricing trends (especially in metro Ethernet and SD-WAN markets)
    - Prices published by other Indian operators in their product portfolios

6. Negotiated Pricing

- In enterprise and government deals, tariffs are often **negotiated on a case-by-case basis**.
- Custom packages may be created based on volume, bundling (e.g., voice, data, cloud), and long-term business potential.

7. Bundling Strategies

- DLC services are sometimes bundled with:
    - Internet access
    - MPLS VPN
    - Managed services (firewall, routing, cloud hosting)
- Tariffs are influenced by the **combined value proposition**.

8. Regulatory and USOF Considerations

- In rural or underserved areas, where Universal Service Obligation Fund (USOF) support is available, pricing may be adjusted to reflect **subsidies** or **lower operating margins**.

These methodologies enable service providers to balance **profitability**, **competitiveness**, and **service quality**, while ensuring flexibility under the current forbearance regime.

Here's a comparative overview of the **Domestic Leased Circuit (DLC)** pricing strategies adopted by major Indian telecom operators:

Comparative Overview of DLC Pricing Strategies

Operator	Pricing Approach	Key Features
Bharti Airtel	Hybrid of cost-based and market-based pricing	Offers tiered pricing models with volume discounts; emphasizes SLAs and network reliability.
Reliance Jio	Aggressive market-based pricing	Focuses on competitive rates to capture market share; leverages extensive fiber infrastructure.
Vodafone Idea	Value-based pricing with bundling	Combines DLCs with other services like MPLS and cloud solutions; offers customized packages.
BSNL	Cost-plus pricing	Adheres to government-mandated pricing structures; focuses on rural and underserved areas.

With rapid advancements in **networking technologies**, **AI-driven optimization**, and **user demand trends**, the current approaches for determining **Domestic Leased Circuit (DLC)** tariffs under *forbearance* will require strategic evolution. Below are **key changes** recommended in the methodologies and approaches adopted by service providers for future DLC tariff determination:

1. Transition from Static to Dynamic Pricing Models

- **Current**: Static tariffs based on fixed bandwidth and distance tiers.
- **Future Need**: Use of AI/ML algorithms to implement **dynamic, demand-responsive pricing**, adapting to real-time traffic loads, network congestion, and customer usage patterns.

2. Integration of Performance-Based Tariffing

- **Current**: Tariffs do not fully reflect SLA quality parameters.
- **Future Need**: Move toward **QoS-based pricing**, where parameters like latency, uptime, jitter, and throughput influence tariffs.

3. Technology-Neutral Tariff Structures

- **Current**: Tariffs may vary by underlying technology (fiber, microwave, etc.).
- **Future Need**: Develop **technology-agnostic pricing** based on service outcomes, ensuring fair competition across legacy and next-gen access technologies (e.g., SD-WAN, satellite, 5G FWA).

4. Modular, Usage-Based Pricing

- **Current**: Predominantly flat-rate or slab-based.
- **Future Need**: Support **modular pricing** models (e.g., base + per Mbps + per SLA tier), allowing customers to customize according to business needs.

5. Incorporation of Software-Defined and Virtualized Networks

- **Current**: Physical infrastructure drives cost model.

- **Future Need**: With SDN/NFV adoption, costs shift toward orchestration and software management. Pricing models must reflect **virtual circuit provisioning and automation efficiencies**.

6. Greater Regulatory Transparency and Benchmarking

- **Current**: Forbearance limits public access to comparative pricing data.
- **Future Need**: Encourage **voluntary benchmarking portals** or a regulated reporting framework to help SMEs and smaller institutions make informed choices, increasing consumer empowerment.

7. Lifecycle Tariffing

- **Current**: One-time pricing with fixed renewal terms.
- **Future Need**: Introduce **lifecycle-sensitive tariffs**—reduced rates for long-term customers, upgrades to higher speeds, or transition incentives to cloud-based connectivity.

8. Sustainability-Linked Tariffing

- **Emerging Need**: Encourage service providers to adopt **green pricing models** where energy-efficient or shared infrastructure deployments receive tariff benefits.

9. AI-Powered Cost Analytics for Tariff Justification

- Future models should incorporate **AI-driven cost analytics** to optimize network resource usage and tariff planning, ensuring transparency and profitability.

The future of DLC tariff methodologies will move from **cost-plus and static market-based models** toward **real-time, performance-driven, and modular frameworks**, enabled by **digital transformation**, **virtualized networks**, and **regulatory support**.

7. Evolving customer requirements and expectations in relation to DLC services :

Evolving customer requirements and expectations related to **Domestic Leased Circuits (DLCs)** are being shaped by digital transformation, cloud migration, remote work trends, and the increasing need for always-on connectivity. Both **present** and **future** expectations reflect a shift from static connectivity toward more flexible, scalable, and performance-oriented services. Here's a categorized overview:

A. Current Customer Requirements :

1. High Availability and Reliability

- Customers expect **>99.5% uptime** with minimal service disruption.
- **Redundant paths** and **auto-failover** capabilities are increasingly demanded.

2. Fixed Bandwidth with Guaranteed Performance

- Requirement for **symmetrical bandwidth** with guaranteed throughput.
- SLA-based delivery on **latency**, **packet loss**, and **jitter**.

3. Transparent and Predictable Pricing

- Customers want clear visibility of:
    - Installation charges
    - Monthly rentals
    - Penalties or rebates for SLA violations

4. 24/7 Support and Proactive Monitoring

- Expectation of **enterprise-grade NOC** support and **real-time fault alerts**.
- Rapid Mean Time to Repair (MTTR) commitments.

5. Custom Solutions for Enterprise Needs

- Custom DLC packages integrated with **MPLS, VPN, Cloud Interconnect**.

B. Evolving/Future Customer Expectations (2025–2030)

1. On-Demand and Scalable Bandwidth

- Ability to scale bandwidth **dynamically based on workload** (e.g., via self-care portal or APIs).
- Pay-as-you-use models for bandwidth bursts.

2. Technology-Agnostic Connectivity

- Customers won't care about fiber, 5G, or satellite — they expect **seamless, high-performance circuits**, regardless of medium.

3. Edge Connectivity & Cloud Proximity

- With increasing cloud dependency, clients expect DLCs with **direct low-latency links to cloud providers** (AWS, Azure, etc.).
- **Edge data center connectivity** will become crucial.

4. Security Integration

- Expectations of **in-built encryption**, **DDoS protection**, and **network traffic isolation** in leased lines.
- Demand for **compliance-ready DLCs** (e.g., HIPAA, ISO 27001, etc.).

5. Software-Defined and Self-Service Capabilities

- Self-provisioning, reconfiguration, and monitoring via portals or APIs.
- Integration with **SD-WAN** and **network slicing** (especially over 5G).

6. Sustainability and Energy Efficiency

- Growing expectation for **green connectivity**—circuits powered by clean energy, low carbon footprints, and environment-friendly installations.

7. Hybrid Bundled Services

- Users want unified packages of:
    - DLC + Internet backup + Cloud Storage + Managed IT
    - With single invoice and SLA

Summary Table :

Expectation Type	Present	Evolving / Future
Availability & Uptime	>99.5%	Self-healing, AI-managed
Bandwidth Model	Fixed	Elastic / Scalable
Pricing	Flat	Usage-based, dynamic
Technology	Fiber/Microwave	Agnostic (SDN, Satellite, 5G)
Customer Control	Support-ticket based	Self-service Portals, APIs
Security	Basic firewall	End-to-end encryption, compliance-ready
Cloud Integration	Optional	Direct-to-cloud essential
Green Connectivity	Not considered	Priority factor for CSR/government clients

8. Challenges faced by small service providers, customers or new entrants in the current DLC market :

In the current and evolving **Domestic Leased Circuit (DLC)** market, **small service providers**, **customers (especially SMEs/rural users)**, and **new entrants** face a range of significant **barriers and challenges**—both **structural** and **technological**. Below is a categorized analysis of these challenges:

A. Challenges for Small Service Providers & New Entrants

1. High Infrastructure Costs

- DLCs require extensive fiber roll-out, network hardware, and POPs.
- **Capital-intensive** nature makes it difficult for new players to compete with large telcos.

2. Limited Access to Backhaul and Interconnect

- Lack of access to shared or neutral backhaul limits service expansion.
- Incumbents may deny **fair interconnect or tower sharing**, making access unequal.

3. Absence of Wholesale Tariff Regulation

- No regulated wholesale access pricing for DLCs leads to **non-transparent and discriminatory pricing** for smaller providers.

4. Low Economies of Scale

- Unlike large operators, small players can't leverage national demand aggregation to lower per-circuit costs.

5. Spectrum and Right-of-Way (RoW) Barriers

- Getting RoW from municipal bodies or state authorities remains **slow, inconsistent, and costly**, disproportionately affecting new entrants.

6. Lack of Access to Universal Service Support

- USOF benefits are mostly limited to BSNL; **small ISPs rarely receive subsidies** for rural DLC deployment.

B. Challenges for Customers (Especially SMEs, Rural Enterprises)

1. High Tariffs and Complex Pricing

- Under forbearance, customers (especially SMEs) face **non-standard, opaque tariff models**, with few comparative benchmarks.

2. Limited Choice of Providers

- In Tier-2, Tier-3 cities or rural areas, often **only one or two DLC providers** exist—limiting bargaining power and service quality.

3. Low Customization for Small Users

- Providers design DLCs for large enterprises, while **SMEs often get overpriced, over-provisioned circuits** or no offering at all.

4. Lack of SLA Enforcement

- Even with SLAs, **smaller users struggle to get accountability** or rebates for service degradation or downtime.

5. Digital and Cloud Readiness Gap

- DLC services still **lack native integration** with cloud, cybersecurity, or remote work solutions—especially for non-corporate clients.

C. Emerging/Future Challenges (2025–2030)

1. Technological Obsolescence

- With rise of SD-WAN, satellite broadband, and 5G slicing, DLC providers **must evolve beyond legacy leased line models**.
- Small players may lack R&D and CapEx for this transition.

2. Fragmented Regulatory Compliance

- Upcoming security, data localization, and cyber audit requirements may **overwhelm smaller ISPs or local providers**.

3. Vendor Lock-in and Proprietary Systems

- New DLC offerings (especially bundled or SDN-based) may be **locked into proprietary ecosystems**, creating entry barriers for interoperable or open systems.

4. Sustainability and Green Mandates

- Environmental compliance (e.g., energy-efficient PoPs, green RoW rules) may become mandatory, adding cost burden on new entrants.

Summary Table of Key Challenges :

Stakeholder	Current Challenges	Future Challenges
Small Providers	Infra cost, RoW hurdles, lack of scale	SDN adoption cost, regulatory complexity, ESG pressure
New Entrants	Market access, unfair wholesale terms	Interoperability, vendor lock-in
SME/Rural Customers	Opaque pricing, low choice, poor SLAs	Lack of cloud/SD-WAN integration, service affordability
All Stakeholders	Forbearance-driven disparity, no benchmarking	Competitive pressure from non-telco connectivity tech

9. Global best practices in DLC tariff frameworks and their potential relevance for the Indian context :

Global best practices in **Domestic Leased Circuit (DLC)** tariff frameworks reflect a shift toward **fair access**, **performance-based pricing**, and **technology neutrality**, with strong regulatory oversight in many jurisdictions. These practices can offer valuable lessons for improving India's current **forbearance-based regime**. Below is a comprehensive overview:

1. Regulated Wholesale Access Pricing

Countries: UK, Australia, EU nations
Practice:

- National regulators (e.g., Ofcom in the UK, ACCC in Australia) **regulate access pricing** for leased circuits offered by incumbents to smaller ISPs.
- Tariffs are based on **cost models (e.g., LRIC – Long-Run Incremental Cost)**.

Relevance to India:

- Could help Indian small providers access fair-priced backhaul/DLCs from BSNL or large telcos.
- Encourages **market competition** and improves rural DLC availability.

2. Transparent Retail Benchmarking Portals

Countries: Singapore (IMDA), New Zealand (Commerce Commission)
Practice:

- Regulators mandate **publication of all business-grade tariff plans**.
- Customers can **compare bandwidth, SLAs, prices** on official portals.

Relevance to India:

- TRAI could introduce a **DLC plan comparison dashboard** for enterprise users, improving **pricing transparency**.

3. Performance-Based Tariff Models

Countries: USA (FCC Enterprise Broadband rules), South Korea
Practice:

- Tariffs vary based on **guaranteed service levels**: latency, jitter, uptime.
- Some markets allow **premium SLAs at higher tariffs**, promoting differentiated services.

Relevance to India:

- Indian telcos can move away from flat pricing and offer **graded service tiers**, enabling SMEs to select what they need and can afford.

4. Technology-Neutral Tariffing

Countries: EU Digital Agenda Framework
Practice:

- Regulations enforce **technology-neutral access rules** — same tariff regardless of whether service is via fiber, microwave, or 5G fixed wireless.

Relevance to India:

- Important in India's **rural and hilly areas** where fiber is limited; allows fair DLC pricing over microwave, 5G, satellite.

5. Subsidy and Support for Rural or Underserved Areas

Countries: USA (E-Rate Program), Canada (Connect to Innovate), Australia (NBN)

Practice:

- Government provides **subsidized DLCs** for schools, hospitals, or rural businesses.
- Leased line expansions are co-funded through **Universal Service Funds**.

Relevance to India:

- Extend **USOF support** to private DLC providers serving rural India, beyond BSNL.

6. Standardized SLAs and Compensation Frameworks

Countries: UK, Germany

Practice:

- SLAs are legally enforceable; failure results in **automatic service credits or penalties**.
- Detailed SLA templates are published by regulators.

Relevance to India:

- TRAI could define a **standard SLA template** with thresholds and compensation rules to protect DLC users.

7. Encouragement of Wholesale-Only or Neutral Networks

Countries: Singapore (NetLink Trust), Sweden (Stokab model)

Practice:

- Infrastructure companies provide **wholesale DLCs** without offering retail services, ensuring fair access for all ISPs.

Relevance to India:

- Explore **neutral fiber providers** in industrial parks or smart cities to ensure DLC competition.

FORWARD-LOOKING BEST PRACTICES

Practice	Countries Leading	Application in India
AI-driven dynamic tariff optimization	South Korea, USA	Introduce pilot in urban DLC zones
DLC with built-in cybersecurity	Israel, EU	Enforce encryption and DoS protection in SLAs
Pay-as-you-use DLCs (burstable rates)	USA, Singapore	SME-friendly pricing flexibility
Edge-to-cloud dedicated circuits	Germany, Japan	Integrate with India's public cloud infra

Practice	Countries Leading	Application in India
ESG-linked DLC incentives	Netherlands, Sweden	Discounted tariffs for sustainable rollouts

RECOMMENDATION FOR INDIA

India can adopt a **hybrid approach**: maintain forbearance for innovation, but add regulatory guardrails like **benchmarking, SLA norms, rural subsidies**, and **wholesale access regulations**, ensuring DLCs evolve in sync with **global digital infrastructure goals**.

Thanks.

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