



Digital Communications India Forum (DCIF)

(A Unit of PTC India Foundation)

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Comprehensive Response to TRAI Consultation on Public Wi-Fi Proliferation in India

Executive Summary

India's Public Wi-Fi ecosystem must be transformed into mission-driven national digital infrastructure. Public Wi-Fi should be treated as an essential public utility supporting AI, governance, education, healthcare, Industry 4.0, and digital inclusion, along with adequate security.

The broad band connectivity is essential utility for everyday life but still there are unconnected Places villages and infrastructures therefore a prioritization in implementation should done based on need and transformational potential and not ease of implementation.

Central Government, State Governments, and NOFN/BharatNet frameworks may provide Revenue Gap Funding support to TSPs/ISPs for universal Public Wi-Fi deployment.

Key goals (for 2030):

- i. Hotspot within 1–2 km for 99% of habitations
- ii. 10 Gbps hotspot backhaul (minimum 1 Gbps in rural areas to start with)
- iii. 1 Gbps user capability (minimum 300 Mbps in rural area, to start with)
- iv. 300 Mbps minimum user throughput (minimum 100 Mbps in rural areas to start with)
- v. PM-WANI and PDO viability
- vi. **Make in India** manufacturing to be enabled by PLI, electronics cluster, component-manufacturing promotion, value addition
- vii. C-DOT to be given responsibility of technical backbone of the mission
- viii. Sovereign governance, security and lifecycle maintenance
- ix. Use of CSR Funds, besides DBN, for proliferation of Wi-fi in rural areas.
- x. Handset, tablet and other UE to be promoted through PDO for make in india and low cost as done by Ministry of electronics as IT

Q-1. What are the key supply-side constraints affecting Public Wi-Fi proliferation in India? What targeted policy or regulatory measures may be required to address these supply-side constraints? Please provide your response in detail with justification.

Answer:

India's Public Wi-Fi deployment is delayed and requires urgent acceleration. Broadband and public hotspots should be treated as strategic citizen-centric infrastructure with universal deployment obligations.

A. All citizens, especially rural population, should progressively receive Public Wi-Fi access as a citizen-centric digital entitlement framework.

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B. India should attempt to provide on demand FTTH connectivity to every home in cities with population greater than 10 lakh by 2030.

Public Wi-Fi access infrastructure should progressively be treated as part of India's Digital Public Infrastructure (DPI) and ultimately as a Digital Public Good so that affordable or near-zero-cost broadband access may become universally accessible, similar to other essential public utilities.

Additional Considerations:

- i. Lifecycle maintenance planning from inception
- ii. AI-ready infrastructure planning
- iii. Long-term operational sustainability
- iv. National interoperability and security governance
- v. Accessibility, affordability, and resilient availability are major concerns

Q-2. What are the major demand-side constraints limiting the uptake of Public Wi-Fi services in the country? What targeted policy or regulatory measures may be required to address these demand-side constraints? Please provide your response in detail with justification.

Answer:

PDOs should be essential grassroots partners with:

- i. minimum wage for skilled labour-equivalent earnings should be protected
- ii. Subsidized CapEx
- iii. Break-even within 36 months
- iv. Positive ROI
- v. Retailer billing control
- vi. BharatNet integration

Public Wi-Fi project CapEx funding may additionally leverage:

- i. CSR grants
- ii. Corporate digital inclusion programs
- iii. Philanthropic technology funding
- iv. DBN/USOF support frameworks

to accelerate rural and socially inclusive deployment.

Additional Recommendation:

Private sector participation should be actively encouraged in Public Wi-Fi deployment and service innovation.

To accelerate adoption in rural and underserved areas, service providers may be permitted to offer promotional tariff plans, including tariffs temporarily below cost level, for up to six months from launch of new services in identified rural areas.

Government support mechanisms may include subsidization of capital equipment to improve viability of PDOs and retail Public Wi-Fi outlets. This may include support for:

- i. PDO hardware
- ii. Billing platforms

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- iii. Customer care systems
- iv. Coupon/subsidy management systems
- v. Authentication systems
- vi. Energy backup infrastructure

The responsibility of retailers including:

- i. CSC VLEs
- ii. Udyamis under Government schemes
- iii. BSNL authorized retailers
- iv. Private hotspot/kiosk operators

should include maintaining appropriate KYC documentation to ensure authorized, traceable, and secure usage of services.

Direct Benefit Transfer (DBT)-enabled coupon frameworks may be used by:

- i. Schools
- ii. Hospitals
- iii. Land record departments
- iv. Agriculture departments
- v. e-Mandi platforms
- vi. Other Government agencies

for sponsoring broadband access services funded by Central or State Governments.

Public Wi-Fi tariffs should remain competitive with mobile broadband services and may range from:

- i. Free access during promotional launch periods
- ii. Affordable low-cost daily access plans priced at only a few rupees per day.
- iii. Training and promotion of Wi-fi in first time connected places

C-DOT technologies should be licensed on nominal terms to domestic manufacturers and operators.

Maintenance Opex and long-term AMC frameworks should be integrated into viability models.

Q-3. Despite the PM WANI initiative, scaling the number of public hotspots across diverse geographies, especially in remote and underserved regions, remains uneven. What are the key challenges in expanding both the density and geographic spread of hotspots, and what strategies could help accelerate more balanced, nationwide coverage? Please provide your response in detail with justification.

Answer:

Central Government should establish a National Public Wi-Fi Mission with sovereign governance, funding, standards, security, industrial policy integration, and long-term maintenance governance.

The Central Govt. should make concerted efforts on priority, to take public Wi-fi to areas/persons who need it most.

Role of Central Government may primarily focus on:

- i. National specifications and standards
- ii. Sovereign governance frameworks

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- iii. Provision of core infrastructure such as NOFN/BharatNet on shared or free-access basis
- iv. National interoperability and security architecture
- v. Provide suitable subsidies to make public Wi-fi accessible to needy persons/areas on priority

Q-4. What changes, if any, are required in the existing PM-WANI framework to improve revenue certainty and long-term sustainability for PDOs/PDOAs? Please provide your response in detail with justification.

Answer:

States should simplify RoW, promote electronics manufacturing, support local entrepreneurs, leverage state enterprises, and establish deployment/manufacturing MoUs.

State Governments should facilitate Public Wi-Fi zones using latest affordable technologies and may consider free or highly affordable access models for rural populations.

State Governments should proactively establish Public Wi-Fi hotspots in:

- i. Rural schools
- ii. Hospitals
- iii. Tourist locations
- iv. Common Service Centres (CSCs)
- v. Public service delivery points

States may additionally support or subsidize associated backhaul costs for such socially important infrastructure.

States should also facilitate:

- i. Regional maintenance hubs
- ii. Local repair ecosystems
- iii. Secure deployment zones
- iv. District-level operational support

The flexibility of moving hotspots-based on business, like mandi haat, Sunday market, Mandir or functions areas

Q-5. Are there any other challenges currently faced by PDOAs/PDOs? If yes, what changes can enhance the participation of entrepreneurs under the PM-WANI framework? Please provide your response in detail with justification.

Answer:

Municipalities and panchayats should provide free RoW, propose hotspot locations, and coordinate through district administration.

Central Government, State Governments, and NOFN/BharatNet frameworks may provide Revenue Gap Funding support to TSPs/ISPs for universal Public Wi-Fi deployment.

TSPs/ISPs may be mandated to provide Public Wi-Fi coverage at all identified locations without arbitrary discretion.

Additional responsibilities:

- i. Physical security of hotspot infrastructure
- ii. Facilitation of maintenance access

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- iii. Protection of fiber routes
- iv. Local operational coordination

Q-6. Are there improvements needed in the Authentication, Authorization, Roaming, and Payment architecture of the PM-WANI Framework? Please share suggestions, if any. Please provide your response in detail with justification.

Answer:

TSPs/ISPs should provide affordable backhaul, support rural deployment under USO, and integrate Public Wi-Fi into broadband infrastructure.

Additional Recommendation:

A centralized National Network Management and Orchestration Center should be established and maintained by the Central Government for ongoing operational effectiveness, sovereign governance, lifecycle management, and future planning of Public Wi-Fi infrastructure.

The centralized platform should perform comprehensive FCAPS functions including:

- i. Fault Management
- ii. Configuration Management
- iii. Accounting Management
- iv. Performance Management
- v. Security Management

The platform should additionally support:

- i. AI-assisted predictive maintenance
- ii. Real-time KPI monitoring
- iii. SLA compliance supervision
- iv. Capacity planning
- v. Traffic analytics
- vi. Energy monitoring
- vii. Security event monitoring
- viii. Automated fault ticketing
- ix. National interoperability supervision
- x. Disaster recovery coordination
- xi. Long-term infrastructure planning

National KPI frameworks should be formally specified for:

- i. Network uptime
- ii. Throughput
- iii. Latency
- iv. User experience
- v. Security incidents
- vi. Restoration timelines
- vii. Energy efficiency
- viii. Backhaul availability
- ix. Rural connectivity performance

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TRAI may consider regulating PM-WANI backhaul pricing using a Retail-Minus pricing framework to prevent vertical price squeeze and ensure fair viability for PDOs and Public Wi-Fi ecosystem participants.

Technical obligations should include:

- i. Secure encrypted backhaul
- ii. Redundant routing
- iii. SLA-based uptime obligations
- iv. Predictive maintenance
- v. Rapid restoration mechanisms
- vi. Regional maintenance centers

Q-7. In the Indian context, which of the following models would be more appropriate for the proliferation of Public Wi-Fi?

- a. A model where the Government actively ensures hotspot deployment through direct funding and implementation support, including backhaul provision; or**
- b. A model where the Government primarily ensures availability of robust backhaul infrastructure and intervenes in hotspot deployment only in cases of market failure.**

Please provide your response in detail with justification.

Answer:

JAM architecture, UPI, Aadhaar (optional), retailer billing, couponing, PM-WANI nomadic interoperability, and MAC authentication should be integrated.

The OTP based authentication may also be adopted as part of JAM architecture, but user should be enabled even if he does not have mobile SIM by proper document verification.

Additional Recommendation:

All PM-WANI and Public Wi-Fi users should preferably access services through a common interoperable national application framework to ensure simplicity, portability, and ease of use across operators and hotspot providers.

Billing, authentication, customer care, complaint handling, and user experience should adopt:

- i. Common formats
- ii. Standardized processes
- iii. Unified look and feel
- iv. Common user interface principles
- v. National roaming interoperability
- vi. Standardized service transparency mechanisms This would improve:
- vii. Ease of use
- viii. User trust
- ix. National interoperability
- x. Consumer protection
- xi. Faster adoption
- xii. Seamless mobility across hotspots

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- xiii. Consistent customer experience The framework should support:
- xiv. PM-WANI interoperability
- xv. JAM integration
- xvi. UPI payments
- xvii. Secure authentication
- xviii. Multi-language support
- xix. Accessibility requirements
- xx. Unified customer grievance systems

In place of a fully centralized PM-WANI registry architecture, India may progressively evaluate decentralized registry mechanisms using Blockchain or similar distributed ledger technologies.

This may support:

- i. Auto-open roaming
- ii. Trusted interoperability
- iii. Secure distributed authentication
- iv. Improved portability
- v. Reduced single-point dependency
- vi. Scalable national interoperability

Additional safeguards:

- i. Secure captive portals
- ii. HTTPS onboarding
- iii. Device fingerprinting
- iv. Session protection
- v. Fraud detection systems
- vi. Standardized customer care

Q-8. Is there a need to adopt separate strategies for Public Wi-Fi proliferation in rural and urban areas? If yes, suggestions may be provided. Please provide your response in detail with justification.

Answer:

Public Wi-Fi should implement sovereign NOC, domestic routing, lawful interception, WPA3, AI cybersecurity, and privacy safeguards.

However, its compliance should not be a burden on PDOs, etc. Rules can be somewhat different for border & other security sensitive areas.

Additional Recommendation:

A centralized National Network Management and Orchestration Center should be established and maintained by the Central Government for ongoing operational effectiveness, sovereign governance, lifecycle management, and future planning of Public Wi-Fi infrastructure.

The centralized platform should perform comprehensive FCAPS functions including:

- i. Fault Management

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- ii. Configuration Management
- iii. Accounting Management
- iv. Performance Management
- v. Security Management

The platform should additionally support:

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- iii. SLA compliance supervision
- iv. Capacity planning
- v. Traffic analytics
- vi. Energy monitoring
- vii. Security event monitoring
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- ix. National interoperability supervision
- x. Disaster recovery coordination
- xi. Long-term infrastructure planning

National KPI frameworks should be formally specified for:

- i. Network uptime
- ii. Throughput
- iii. Latency
- iv. User experience
- v. Security incidents
- vi. Restoration timelines
- vii. Energy efficiency
- viii. Backhaul availability
- ix. Rural connectivity performance

Technical security measures:

- i. WPA3 mandatory
- ii. Client isolation
- iii. Secure boot
- iv. Signed firmware
- v. MACsec/IPSec
- vi. Secure OTA updates
- vii. Rogue AP detection
- viii. AI cyber defense
- ix. Zero-trust principles
- x. SIEM and threat intelligence systems

Sovereignty safeguards:

- i. Domestic routing
- ii. India-hosted NOC
- iii. Data localization

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- iv. Trusted equipment policy

Q-9. What measures can be taken to improve the deployment and uptake of Public Wi-Fi networks in high-footfall areas for both outdoor (such as bus stops, roadside transit points, open public parks, markets, tourist sites), and indoor (such as airports, railway stations, malls, public institutions)? Please provide your response in detail with justification, separately for outdoor and indoor scenarios.

Answer:

India should establish future-ready standards through Wi-Fi 6/6E/7, interoperability labs, TSDSI/IEEE leadership, and C-DOT integration.

Additional Sustainability and Power Resilience Measures:

End-user Public Wi-Fi hotspots should progressively be powered through:

- i. Solar energy
- ii. Wind energy
- iii. Hybrid renewable systems
- iv. Locally available green energy sources

Public Wi-Fi deployments should incorporate minimum 8-hour uninterrupted backup power capability, especially for:

- i. Rural areas
- ii. Disaster-prone regions
- iii. Remote habitations
- iv. Governance systems
- v. Emergency communication continuity

All Public Wi-Fi infrastructure components including Wi-Fi access points, Routers, Compute elements, Edge devices, Authentication systems, and User handsets should prioritize low power consumption and energy-efficient design.

As a sustainability guideline, hotspot infrastructure nodes should preferably operate at less than 100 watts total power consumption wherever technically feasible.

Strategic benefits:

- i. Lower operational expenditure
- ii. Better rural viability
- iii. Reduced carbon footprint
- iv. Improved uptime reliability
- v. Sustainable AI-era digital infrastructure

Advanced Fiber Access and Backhaul Architecture:

Public Wi-Fi infrastructure should adopt a hierarchical and resilient backhaul framework based on feasibility, availability, scalability, sustainability, and resilience.

Preferred hierarchy:

- i. Redundant optical fiber backhaul
- ii. Wi-Fi based directional links
- iii. Fixed wireless / microwave radio

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- iv. Mobile 5G-based backhaul
- v. Satellite-based backhaul

Fiber-based backhaul should remain the preferred architecture wherever feasible due to:

- i. Lower power consumption
- ii. Longer operational reach
- iii. Higher capacity
- iv. Better reliability
- v. Lower lifecycle operational cost
- vi. Better sustainability

Recommended optical access technologies:

- i. GPON
- ii. XGS-PON
- iii. DWDM-PON
- iv. Advanced optical access systems

Dual-link redundant optical connectivity should be encouraged wherever feasible through:

- i. Ring architecture
- ii. Dual feeder fiber
- iii. Diverse physical routing
- iv. Automatic failover systems

Q-10. If the Government decides to provide financial support for the proliferation of Public Wi-Fi, which funding mechanisms would be most suitable for India? Should a uniform funding mechanism be adopted nationwide, or should differentiated funding mechanisms be used for rural, urban, and high-footfall areas? Please provide your response in detail with justification.

Answer:

Apex governance board with Centre-State political leadership should oversee mission implementation.

Additional Recommendation:

A centralized National Network Management and Orchestration Center should be established and maintained by the Central Government for ongoing operational effectiveness, sovereign governance, lifecycle management, and future planning of Public Wi-Fi infrastructure.

The centralized platform should perform comprehensive FCAPS functions including:

- i. Fault Management
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- iii. Accounting Management
- iv. Performance Management
- v. Security Management

The platform should additionally support:

- i. AI-assisted predictive maintenance
- ii. Real-time KPI monitoring

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- iii. SLA compliance supervision
- iv. Capacity planning
- v. Traffic analytics
- vi. Energy monitoring
- vii. Security event monitoring
- viii. Automated fault ticketing
- ix. National interoperability supervision
- x. Disaster recovery coordination
- xi. Long-term infrastructure planning

National KPI frameworks should be formally specified for:

- i. Network uptime
- ii. Throughput
- iii. Latency
- iv. User experience
- v. Security incidents
- vi. Restoration timelines
- vii. Energy efficiency
- viii. Backhaul availability
- ix. Rural connectivity performance

This centralized orchestration framework will improve:

- i. National operational visibility
- ii. Infrastructure reliability
- iii. Predictive maintenance capability
- iv. Sovereign control
- v. AI-era scalability
- vi. Future network evolution planning

Governance architecture should include:

- i. Sovereign National NOC
- ii. Regional maintenance centers
- iii. District operational cells
- iv. Centralized monitoring
- v. SLA governance
- vi. Security operations oversight

Recommended Funding Mechanisms for Public Wi-Fi Proliferation:

A differentiated, area-specific funding approach is recommended, as a uniform nationwide mechanism cannot adequately address the varying commercial viability and deployment challenges across rural, urban, and high-footfall areas. The following funding mechanisms are most suitable for India:

- i. Universal Service Obligation Fund (USOF) support for rural and underserved areas, schools, health centres, and community networks, channelled through

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- licensed service providers (TSPs/ISPs) in accordance with USOF disbursement rules.
- ii. Viability Gap Funding (VGF) for commercially unviable deployments in rural and remote areas, including PM-WANI networks, to bridge the gap between cost of deployment and commercially recoverable revenue.
 - iii. Capital expenditure grants for access points, routers, backhaul equipment, power systems, and network management platforms, with priority for PDOs in underserved areas.
 - iv. Government schemes such as PLI (Production Linked Incentive) and Make in India should be leveraged to encourage local manufacturing of Wi-Fi equipment and hotspot hardware. Govt should promote & encourage indigenous manufacturing of wi-fi equipment, as well as low cost smart phones & devices, to enhance affordability among masses. The indigenous manufacturing will also take care of security issues to a large extent. Duty-free import should be permitted for components and inputs used in domestic manufacturing of Wi-Fi hotspots, while maintaining alignment with DOT's policy of promoting finished equipment from domestic manufacturers.
 - v. GST reduction or exemption on Wi-Fi equipment and related infrastructure; customs duty relief for imported networking and broadband equipment (subject to periodic review to protect the domestic manufacturing industry).
 - vi. Low-interest loans, credit guarantees, and concessional BharatNet backhaul access for small operators and entrepreneurs (PDOs), and credit support to improve PDO viability.
 - vii. Demand-side subsidies such as Direct Benefit Transfer (DBT)-enabled digital vouchers and connectivity credits for students, low-income users, and rural communities.
 - viii. Public sector anchor demand through government procurement and mandatory WiFi deployment in schools, hospitals, panchayats, railway stations, bus terminals, and tourist sites to create stable commercial demand. Note: reverse auction models deployed in earlier broadband initiatives have had limited success and should be avoided as the primary procurement mechanism for Wi-Fi hotspot deployment.

Q-11. What criteria should govern the allocation and disbursement of funds across rural, urban, and high-footfall areas, respectively? Please provide your response in detail with justification.

Answer:

TSDSI and IEEE collaboration should actively shape future Wi-Fi standards, supported by innovation labs and domestic ecosystems.

Additional areas:

- i. Security certification
- ii. Firmware validation
- iii. Lifecycle maintenance standards
- iv. Interoperability testing

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- v. Equipment certification

Criteria for Fund Allocation and Disbursement:

Rural Areas:

- i. Priority based on population density, existing connectivity deficit, and socioeconomic indicators (poverty index, digital literacy levels).
- ii. USOF and VGF disbursement tied to verified deployment milestones and operational uptime SLAs.
- iii. Preference for locations with existing BharatNet/NOFN backhaul availability to maximise deployment speed and cost efficiency.
- iv. A Framework of administering subsidies and viability gap funding through a centralised portal with realtime payment, revenue, and usage data be part of central network management system extended for accommodating payment gateway, revenue monitoring and financial reconciliation to be recommended by TRAI

Urban Areas:

- i. Funding focused on public institutions, government buildings, and underserved urban pockets; commercially viable urban zones should rely primarily on private investment with regulatory facilitation. xi. Municipal waiver of RoW charges, property taxes, and fees as an indirect fiscal subsidy to reduce deployment costs.

High-Footfall Areas (Railways, Airports, Tourist Sites, Markets):

- ii. Public procurement to mandate Wi-Fi as essential infrastructure; government anchor demand provides revenue visibility to attract private operators.
- iii. Disbursement linked to user throughput and experience KPIs, not merely deployment count, to ensure quality outcomes.

Q-12. Is the lack of adequate and reliable last-mile connectivity a critical constraint for the proliferation of Public Wi-Fi in the country? If yes, what specific measures may be considered by the Central Government, State Governments, and local bodies to address the last-mile constraints? Please provide your response in detail with justification.

Answer:

Public Wi-Fi requires diversified revenue, PDO viability, manufacturing growth, maintenance economics, and strategic public support.

Additional Recommendation:

All PM-WANI and Public Wi-Fi users should preferably access services through a common interoperable national application framework to ensure simplicity, portability, and ease of use across operators and hotspot providers.

Billing, authentication, customer care, complaint handling, and user experience should adopt:

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- ii. Standardized processes
- iii. Unified look and feel

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- iv. Common user interface principles
- v. National roaming interoperability
- vi. Standardized service transparency mechanisms This would improve:
- vii. Ease of use
- viii. User trust
- ix. National interoperability
- x. Consumer protection
- xi. Faster adoption
- xii. Seamless mobility across hotspots
- xiii. Consistent customer experience The framework should support:
- xiv. PM-WANI interoperability
- xv. JAM integration
- xvi. UPI payments
- xvii. Secure authentication
- xviii. Multi-language support
- xix. Accessibility requirements
- xx. Unified customer grievance systems

Private sector participation should be actively encouraged in Public Wi-Fi deployment and service innovation.

To accelerate adoption in rural and underserved areas, service providers may be permitted to offer promotional tariff plans, including tariffs temporarily below cost level, for up to six months from launch of new services in identified rural areas.

Government support mechanisms may include subsidization of capital equipment to improve viability of PDOs and retail Public Wi-Fi outlets. This may include support for:

- i. PDO hardware
- ii. Billing platforms
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- iv. Coupon/subsidy management systems
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- vi. Energy backup infrastructure

The responsibility of retailers including CSC VLEs, Udyamis under Government schemes, BSNL authorized retailers, and Private hotspot/kiosk operators should include maintaining appropriate KYC documentation to ensure authorized, traceable, and secure usage of services.

Direct Benefit Transfer (DBT)-enabled coupon frameworks may be used by Schools, Hospitals, Land record departments, Agriculture departments, e-Mandi platforms, and Other Government agencies for sponsoring broadband access services funded by Central or State Governments.

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Financial sustainability should include:

- i. Maintenance Opex support
- ii. AMC frameworks
- iii. Spare logistics funding
- iv. SLA-linked payments
- v. Security lifecycle budgeting

Q-13. Is there a need for the Government to provide funding for provisioning of last-mile connectivity in the uncovered or underserved areas for Public Wi-Fi networks? If yes, which funding option is best suited in the Indian context, and what should be the criteria for rural, urban, and high footfall areas, respectively? Please provide your response in detail with justification.

Answer:

Public Wi-Fi should be integrated into all major public infrastructure projects, with mandatory hotspot feasibility for projects above ₹100 crore.

Additional reforms:

- i. Mandatory security audits
- ii. Equipment certification
- iii. Uptime obligations
- iv. Restoration timelines
- v. Secure supply-chain requirements

Government Funding for Last-Mile Connectivity:

Yes, government funding for last-mile connectivity in uncovered and underserved areas is essential. The recommended funding options and criteria, by area type, are as follows:

- i. Rural and remote areas: USOF-funded hotspot deployment programmes channelled through licensed TSPs/ISPs; Viability Gap Funding (VGF) for PM-WANI networks; concessional BharatNet backhaul access. Criteria: connectivity deficit, population served, proximity to schools/health centres/CSCs.
- ii. Urban underserved pockets: State and municipal grants for last-mile infrastructure; waiver of RoW fees; shared infrastructure models (open-access fibre, pole sharing). Criteria: household income levels, existing broadband penetration, density of public services.
- iii. High-footfall areas: Mandatory integration of Wi-Fi infrastructure in public sector projects above ₹100 crore; PPP models for commercially viable sites. Criteria: footfall volume, strategic public utility value, revenue recovery potential.

All funding disbursements should be linked to verified deployment, operational uptime SLAs, and user service quality metrics. Reverse auction models previously deployed in broadband initiatives have faced significant implementation challenges and should not be the primary funding mechanism. (See also Q-10 and Q-11 for detailed funding mechanisms and allocation criteria.)

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Q-14. Are there any RoW challenges faced by service providers in accessing public places or street furniture to install Public Wi-Fi hotspots? If yes, details may be provided along with suggestions for improvements. Please provide your response in detail with justification.

Answer:

Viability gap funding, USOF, state incentives for PDOs subsidies and DBT for end users in rural areas, municipal support, and maintenance financing are essential.

Additional Recommendation:

Private sector participation should be actively encouraged in Public Wi-Fi deployment and service innovation.

To accelerate adoption in rural and underserved areas, service providers may be permitted to offer promotional tariff plans, including tariffs temporarily below cost level, for up to six months from launch of new services in identified rural areas.

Government support mechanisms may include subsidization of capital equipment to improve viability of PDOs and retail Public Wi-Fi outlets. This may include support for:

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- v. Authentication systems
- vi. Energy backup infrastructure

The responsibility of retailers including CSC VLEs, Udyamis under Government schemes, BSNL authorized retailers, and Private hotspot/kiosk operators should include maintaining appropriate KYC documentation.

Direct Benefit Transfer (DBT)-enabled coupon frameworks may be used by Schools, Hospitals, Land record departments, Agriculture departments, e-Mandi platforms, and Other Government agencies for sponsoring broadband access services funded by Central or State Governments.

Public Wi-Fi tariffs should remain competitive with mobile broadband services and may range from Free access during promotional launch periods to Affordable low-cost daily access plans priced at only a few rupees per day.

Additional support areas:

- i. Secure equipment subsidies
- ii. AI-NOC infrastructure support
- iii. Rural maintenance incentives
- iv. Security modernization grants

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Q-15. What facilitative roles can State Governments play in accelerating Public Wi-Fi deployment across rural, urban, and high-footfall areas, respectively? Should States consider deploying Public Wi-Fi networks at the municipal and gram panchayat level? Please provide your response in detail with justification.

Answer:

Given AI and digital transformation, Public Wi-Fi should be formally recognized as essential public utility.

National reliability and cybersecurity readiness should be treated as critical public infrastructure obligations.

Q-16. Should the State Government need to take initiatives to improve the availability of last-mile connectivity for Public Wi-Fi networks? If yes, what measures can incentivise States/municipalities to undertake city- and town-level fiberisation to ensure Public Wi-Fi network proliferation? Please provide your response in detail with justification.

Answer:

India should establish a Sovereign National Public Broadband Transformation Mission as foundational digital civilization infrastructure.

The framework should ensure:

- i. Universal access
- ii. Sovereign cybersecurity
- iii. Lifecycle maintenance governance
- iv. AI-era readiness
- v. Industrial growth
- vi. Long-term operational resilience

Q-17. What facilitative roles can local bodies play in accelerating the deployment and sustainable operation of Public Wi-Fi networks in rural and urban areas? Please provide your response in detail with justification.

Answer:

India should establish an integrated "Secure-by-Design + Maintainable-by-Architecture + Sovereign-by-Governance" framework.

Green Energy and Sustainable Power Engineering:

Public Wi-Fi infrastructure should adopt:

- i. Solar-ready architecture
- ii. Smart battery management
- iii. Low-power chipsets
- iv. Efficient cooling systems
- v. Remote power monitoring
- vi. Green equipment certification

Energy-efficient infrastructure design will improve lifecycle sustainability, maintenance efficiency, and operational resilience.

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Additional Recommendation:

A centralized National Network Management and Orchestration Center should be established and maintained by the Central Government for ongoing operational effectiveness, sovereign governance, lifecycle management, and future planning of Public Wi-Fi infrastructure.

The centralized platform should perform comprehensive FCAPS functions including:

- i. Fault Management
- ii. Configuration Management
- iii. Accounting Management
- iv. Performance Management
- v. Security Management

The platform should additionally support:

- i. AI-assisted predictive maintenance
- ii. Real-time KPI monitoring
- iii. SLA compliance supervision
- iv. Capacity planning
- v. Traffic analytics
- vi. Energy monitoring
- vii. Security event monitoring
- viii. Automated fault ticketing
- ix. National interoperability supervision
- x. Disaster recovery coordination
- xi. Long-term infrastructure planning

National KPI frameworks should be formally specified for:

- i. Network uptime
- ii. Throughput
- iii. Latency
- iv. User experience
- v. Security incidents
- vi. Restoration timelines
- vii. Energy efficiency
- viii. Backhaul availability
- ix. Rural connectivity performance

Core components:

- i. Sovereign National NOC
- ii. Regional Operations Centers
- iii. AI-assisted monitoring systems
- iv. Preventive and predictive maintenance
- v. Secure OTA upgrades
- vi. GIS-based fiber mapping
- vii. Redundant routing
- viii. District operational teams

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- ix. SLA-based national operations
- x. Trusted equipment ecosystem
- xi. Interoperability and security labs
- xii. Quantum-era cybersecurity preparedness

Q-18. What regulatory or policy incentives, schemes or programs are required to promote active participation of TSPs and ISPs in Public Wi-Fi deployment? Please provide your response in detail with justification.

Answer:

Public Wi-Fi should implement sovereign NOC, domestic routing, lawful interception, WPA3, AI cybersecurity, and privacy safeguards.

The long-term success of India's Public Wi-Fi ecosystem will depend on sustaining security, reliability, availability, trust, performance, and sovereignty over decades of digital transformation.

Q-19. What regulatory or fiscal incentives, schemes or programs may be required in the provisioning of bandwidth and backhaul for Public Wi-Fi networks? Please provide your response in detail with justification.

Answer:

Key goals:

- i. Hotspot within 1–2 km for 99% of habitations
- ii. 10 Gbps hotspot backhaul
- iii. 1 Gbps user capability
- iv. 300 Mbps minimum user throughput
- v. PM-WANI and PDO viability
- vi. Make in India manufacturing
- vii. C-DOT backbone
- viii. Sovereign governance, security and lifecycle maintenance

Fiscal incentive

- i. Incentive to the hotspot provider should be equal to or more than skilled labour according to Minimum wages laws of the place of operation. this can be enabled by revenue sharing by the TSPs or subsidy through DBT.
- ii. TSPs should be enabled by providing subsidised bandwidth from NoFN or through USOF
- iii. NoFN should be provided separated funding for WiFi mission for backhaul to the TSPs

Regulatory support

- i. Regulatory support for RoW
- ii. Regulatory support through a framework that consolidates usage, revenue, cost for the purpose of DBT to PDOs providers
- iii. Audit framework for compliance to rules by PDOs Provider

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Q-20. What measures can be adopted to incentivise private enterprises, commercial establishments, shop owners, community institutions etc. to install public Wi-Fi hotspots? Please provide your response in detail with justification.

Answer:

Private sector participation should be actively encouraged in Public Wi-Fi deployment and service innovation.

To accelerate adoption in rural and underserved areas, service providers may be permitted to offer promotional tariff plans, including tariffs temporarily below cost level, for up to six months from launch of new services in identified rural areas.

Direct Benefit Transfer (DBT)-enabled coupon frameworks may be used by Schools, Hospitals, Land record departments, Agriculture departments, e-Mandi platforms, and Other Government agencies for sponsoring broadband access services funded by Central or State Governments.

Q-21. Is there a need to strengthen the role of public or private entities as system integrators for the deployment of Public Wi-Fi networks? If yes, what policy or institutional support may be required? Please provide your response in detail with justification.

Answer:

India may establish a dedicated National Wi-Fi Technology Group for contributing to global Wi-Fi technology development and addressing India-specific requirements.

This institution may function independently from C-DOT and should receive:

- i. Dedicated funding
- ii. Defined timelines
- iii. Research mandates
- iv. Standards participation responsibility
- v. Indigenous technology development objectives

Future-readiness should include:

- i. Quantum-resilient roadmap
- ii. AI-based predictive maintenance
- iii. Automated network healing
- iv. National interoperability and security labs

Q-22. Are users facing challenges in the authorization and authentication procedures for accessing Public Wi-Fi Networks? If yes, how can authorization and authentication processes be simplified while ensuring security and compliance? Please provide your response in detail with justification.

Answer:

JAM architecture, UPI, Aadhaar (optional), retailer billing, couponing, PM-WANI nomadic interoperability, and MAC authentication should be integrated.

All PM-WANI and Public Wi-Fi users should preferably access services through a common interoperable national application framework to ensure simplicity, portability, and ease of use across operators and hotspot providers.

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Additional safeguards:

- i. Secure captive portals
- ii. HTTPS onboarding
- iii. Device fingerprinting
- iv. Session protection
- v. Fraud detection systems
- vi. Standardized customer care

Q-23. Is there a need for a centralized platform for authentication and payment systems in the Public Wi-Fi ecosystem? If yes, which entity is best suited for its implementation and management? Please provide your response in detail with justification.

Answer:

A centralized National Network Management and Orchestration Center should be established and maintained by the Central Government for ongoing operational effectiveness, sovereign governance, lifecycle management, and future planning of Public Wi-Fi infrastructure.

In place of a fully centralized PM-WANI registry architecture, India may progressively evaluate decentralized registry mechanisms using Blockchain or similar distributed ledger technologies.

This may support:

- i. Auto-open roaming
- ii. Trusted interoperability
- iii. Secure distributed authentication
- iv. Improved portability
- v. Reduced single-point dependency
- vi. Scalable national interoperability

Q-24. What steps are required to achieve interoperability and seamless roaming among Public Wi-Fi networks? Should inter-hotspot roaming be made mandatory, and if yes, should a "super-aggregator" need to be introduced to facilitate it? Please provide your response in detail with justification.

Answer:

All PM-WANI and Public Wi-Fi users should preferably access services through a common interoperable national application framework to ensure simplicity, portability, and ease of use across operators and hotspot providers.

Billing, authentication, customer care, complaint handling, and user experience should adopt common formats, standardized processes, unified look and feel, common user interface principles, national roaming interoperability, and standardized service transparency mechanisms.

Q-25. What monetisation models are most appropriate for rural, urban, and high-footfall locations, respectively? Please also suggest any additional monetisation models that may be suitable in the Indian context. Please provide your response in detail with justification.

Answer:

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Public Wi-Fi requires diversified revenue, PDO viability, manufacturing growth, maintenance economics, and strategic public support.

Public Wi-Fi tariffs should remain competitive with mobile broadband services and may range from:

- i. Free access during promotional launch periods
- ii. Affordable low-cost daily access plans priced at only a few rupees per day.

Financial sustainability should include:

- i. Maintenance Opex support
- ii. AMC frameworks
- iii. Spare logistics funding
- iv. SLA-linked payments
- v. Security lifecycle budgeting

Q-26. Please provide any additional comments, observations, or suggestions related to the proliferation of Public Wi-Fi in the country, including any potential issues or considerations that may not have been covered in the sections above. Please provide your response in detail with justification.

Answer:

Public Wi-Fi should become universal, sovereign, secure, maintainable, and industrial-scale infrastructure central to India's digital future.

India should pursue:

- i. Universal broadband access
- ii. Sovereign digital infrastructure
- iii. AI-ready public connectivity
- iv. Secure lifecycle governance
- v. Indigenous technology ecosystems
- vi. Long-term operational resilience

Conclusion

Public Wi-Fi should become universal, sovereign, secure, maintainable, and industrial-scale infrastructure central to India's digital future.

India should pursue:

- I. Universal broadband access
- II. Sovereign digital infrastructure
- III. AI-ready public connectivity
- IV. Secure lifecycle governance
- V. Indigenous technology ecosystems
- VI. Long-term operational resilience

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