

First Session of the Asia-Pacific Information Superhighway Steering Committee, 1-2 November 2017, Dhaka, Bangladesh.

DRAFT SUBMISSION OF [Bangladesh]
Broadband Priorities for the Asia-Pacific Information Superhighway Master Plan
25 October 2017

Objective: This form is sent to the representative of each country in order to prioritise activities and better align broadband connectivity gaps with solutions. All country submissions will be consolidated as per AP-IS Pillar and sub-region to develop an implementation plan for 2018 and will be presented by the Secretariat during the First Session of the Asia-Pacific Information Superhighway (AP-IS) Steering Committee, 1-2 November 2017, Dhaka, Bangladesh. A similar template is sent to partners to identify their planned activities.

Please complete this form and submit to ESCAP (escap-ids@un.org) by **no later than 25 October 2017**.

(a). Background Information

(i). Government Ministry/Organization in charge of ICT connectivity: Ministry of Posts, Telecommunications & Information Technology, Ministry of Railways, Ministry of Power, Energy & Mineral Resources (MPEMR), Ministry of Road Transport and Bridges, Roads Transport and Highways Division (RTHD), Bangladesh Telecommunication Regulatory Commission (BTRC), Bangladesh Submarine Cable Company Limited (BSCCL), Bangladesh Telecommunication Company Limited (BTCL), Department of ICT (DoICT), Power Grid Company of Bangladesh Limited (PGCB), Bangladesh Railway (BR), Summit Communications Limited, Fiber@home Limited (FHL)

(ii). National Broadband Policy: Broadband Policy 2009, National Internet Policy 2009

(iii). Completed/Current/planned fibre-optic broadband project: [BSCCL]-- Bangladesh has been connected with the second Submarine Cable SEA-ME-WE-5 on 21st February, 2017 which was officially inaugurated on 10th September 2017.

[BTCL]

1. Project Name: Internet Information Network Expansion
 - a. Status: Completed
 - b. Capacity of Cable(Optical Fiber): 1450km
 - c. Countries Involved: Bangladesh, Korea
 - d. Funding Mechanism & Partners: Korean Govt. & Bangladesh Govt.
2. Project Name: Optical Fiber Cable Development Project of 1000 Union Parishad.
 - a. Status: Completed
 - b. Capacity of Cable(Optical Fiber): 8000km
 - c. Countries Involved: Bangladesh
 - d. Funding Mechanism & Partners: GOB

	<ol style="list-style-type: none"> 3. Project Name: Optical Fiber Cable Development Project of 290 Upazillas <ol style="list-style-type: none"> a. Status: On going b. Capacity of Cable(Optical Fiber): 8900km c. Countries Involved: Bangladesh d. Funding Mechanism & Partners: GOB 4. Project Name: Wireless Broadband Network (4G, LTE) Development Project <ol style="list-style-type: none"> a. Status: on going b. Capacity of Cable(Optical Fiber): 300km c. Countries Involved: Bangladesh d. Funding Mechanism & Partners: Korean Govt.
	<p>Establishing Digital Connectivity Project: Point of Interconnect-21 colocation facility for IIG, NIX, ISP throughout the Nations</p> <p>100G Capacity express network for internet and local content. Domestic traffic retention through NIX aggregation at divisional level. Decentralized connectivity establishment through regional/ remote ISPs</p> <p>Design Principle: Proposed IP backbone is based on high capacity demand and scalable architecture High reliability and redundant protection is considered. Guarantee strict QoS Traffic Privacy, integrity and security on IP back backbone Implementation of Specialized labs. Establish computer labs in educational institute for expanding digital education in remote areas. [DoICT]</p>
	<p>PGCB is planning to deploy country-wide Bandwidth Capacity. [PGCB] PGCB's total OPGW: 5549 Km (up to- May, 2017) PGCB already leased out:</p> <ol style="list-style-type: none"> 1. BTCL (1 Pair) -----3600 Km 2. Fiber @ Home(1 Pair) -----2966 Km 3. Summit Communications Ltd. (1 Pair) -----1684 Km 4. Telco (GP, Robi, Banglalink) (1 Pair) -----450 Km 5. UGC as Corporate Social Responsibility(1 Pair)-3284 Km <ul style="list-style-type: none"> • Total length of optical fiber network = 2421 KM. (Map & details position of optical fiber network have been attached as annexure-A/1, A/2,B,C)

	<ul style="list-style-type: none"> • 2009 km of optical fiber network (out of 2421 KM) has been leased out to GP. • BR has laid new 412 KM optical fiber cable at various sections. Recently BR has signed a contract agreement with Robi Axiata Ltd. regarding leasing one pair of optical fiber core from newly laid 412 KM OFC. • Total length of optical fiber is being installed under ongoing project of BR = 380 KM. • BR is planning to extend its existing optical fiber based Telecommunication network in various sections to cover secondary line (575 KM) of Bangladesh Railway. [BR] <p>Summit Communications Limited, having NTTN, IIG, ITC & ICX licences, built 33000 KM Optical fiber network all over Bangladesh along with 250+ PoPs, which is planned to be expanded to 45000 KM along with 1000+ PoPs within June, 2018. [Summit]</p> <p>Fiber@Home Limited (FHL) is the leading end to end telecom infrastructure provider in Bangladesh. Over last 8 years we have developed our relationship among the majority stakeholders of the industry. Our ultimate vision is to connect every household in Bangladesh with world-class multi-media services with the objective to develop a Digital Bangladesh.</p> <p>For last 8 years Fiber@Home Limited (FHL) has set standards of excellence, innovativeness, creativity and productivity in the sectors it operating. In private sector we have built the country's first State-of-the-Art telecommunication transmission network under Nationwide Telecommunication Transmission Network (NTTN) license issued by Bangladesh Telecommunication Regulatory Commission (BTRC). Among many following few reasons make Fiber@Home Limited (FHL) one of the leading telecommunication infrastructure provider in Bangladesh to support Access Network Service (ANS) Operator's business strategy:</p> <p>Unrivalled Coverage: FHL has access to over 30,138 KMs Optical Fiber Network and extensive PoPs presence having more than 90% nationwide coverage.</p> <p>World Class Services: FHL has introduced world class communication services like Data Connectivity through DWDM, SDH, IP-MPLS & Metro Ethernet Network. It has also introduced Internet, IPLC, IP Transit and other Gateway Services.</p> <p>Guaranteed Performance: FHL is ensuring 24/7 NOC support, Online Ticketing System, 99.99% Service SLA, Dedicated SLA for telecom operators and other major clients, Pro-Active Monitoring, 30 Minutes MTTA, 2 Hours MTTR within Metro Cities & 4 Hours MTTR within Rural, Downtime Reporting, Access to EMS/NMS for network</p>
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monitoring etc.

Customized Solutions and State-of-the-Art Technology: Our highly redundant, meshed network is capable of synchronizing different network topology in a singular platform. This helps our valuable clients to operate their businesses with minimum changes in their available solutions. The network has plenty of capacity to accommodate changes in customer requirements at will. Also it is capable of cater high performance customized networks for business critical traffic.

Dominant Client Base: Our clients include all Mobile Operators, Gateway Operators, Prominent ISPs, Cable TV Operators, Bangladesh ARMY, Police, BDR, National Board of Revenue (NBR), Financial Organizations, Government and Semi Government Organizations, Overseas telecom/carrier service operators etc. These extensive client bases give us confidence to provide and maintain standard service support within Bangladesh and outside of the country.

Positive Momentum: Being the fastest growing network all the prominent ISPs, majority of the 3G base stations (Over 2500), Wi-Max operator's base stations, Gateway operator's voice & data transmission links and the remote Broadband connectivity of the Government are running through us.

Multiple Technical Solutions: Currently we have multiple technical solutions like

- Dense Wavelength Division Multiplexing (DWDM) works by combining and transmitting multiple signals simultaneously at different wavelengths on the same fiber. In effect, one fiber is transformed into multiple virtual fibers which ensure the maximum utilization of resources. Our majority nationwide backbone is developed by using this DWDM solution.
- Synchronous Digital Hierarchy (SDH) standardized protocols that transfer multiple digital bit streams over optical fiber using lasers of highly coherent light from light-emitting diodes (LEDs). Our Long Haul Nationwide Network developed by this technical solution.
- A metropolitan-area Ethernet or Metro Ethernet network is a metropolitan area network that is based on Ethernet standards. It is commonly used to connect subscribers to a larger service network or the

Internet. Our metro cities are covered with this network and different operators are using this network for connecting their enterprises and home users for internet and data connectivity.

- Multiprotocol Label Switching (MPLS) is a mechanism in high-performance telecommunications network that directs data from one network to the next based on short path labels rather than long network addresses, avoiding complex lookups in the routing table. We have deployed MPLS for providing services to the telecom operators for their IP network and ISPs for their backhaul & last mile connectivity.
- A passive optical network (PON) is a telecommunications network that uses point-to-multipoint fiber to the premises in which unpowered optical splitters are used to enable a single optical fiber to serve multiple premises. We are using the solution in few major areas for providing FTTH solutions for providing 3Play services to the end users.

Multiple Licenses: Currently we have multiple licenses like Nationwide Telecommunication Transmission Network (NTTN), International Terrestrial Cable (ITC), and International Internet Gateway (IIG) which help us to establish all solutions for providing Internet, Data & Video, Voice and other VAS services.

We are confident enough to cater the demand of the government, operators, enterprises and home users as we have all basic pre requisite of providing services to them. It is true that, before 2009 (before FHL start commercial operation), there was significant growth in mobile penetration. But, there is insignificant footprint of dedicated or wired internet, data & video and voice service, even in the city areas. Localized ISP providers are trying to deliver good quality bandwidth with a market competitive price. The net effect is there is no creation on high speed internet habituation; this limits further business opportunities not only in telecommunication segment, but also in digital media, content & other communication services. In recent days, there are some fiber based ISP, which are providing better speed to users by using our network.

Extensive fiber infrastructure and multiple technical solutions are not only ensuring the capability to serve the high speed fixed broadband but also providing flexibility to lease diversified content over this infrastructure. The need of this market is a visionary market leader who can take the initiative to understand the service need, build the infrastructure and then price it at optimum level. There is a significant market where the premium quality

service demand can be nurtured. The target would be delivering fiber based high speed fixed broadband connectivity for the segments like ISP, CATV, IP Phone, Video on Demand (VOD), cloud computing etc. To do that Fiber@Home Limited (FHL) is working day and night. As an intelligence driven organization, Fiber@Home Limited (FHL) has a human resource base of about 1000 highly capable people.

BanglaGov.Net and Info-Sarker Phase-2 Project (Completed):

“National Intra-Network Project for Bangladesh Government Phase-II (Info-Sarker)”, this project is an extension of the BanglaGov.Net project which was implemented by Bangladesh Computer Council (BCC) through Korean EXIM Bank Credit. Where all the Ministries/Divisions major Departments, 64 Deputy Commissioner’s offices, 64 District and more than 150 government office were connected under ICT Backbone Network. This network is administered and managed through the establishment of NICTC (National ICT Centre) at BCC; 64 DICTC (District ICT Centre) at DC offices out of which there is 7 DHQ and 64 UICTC (Upazila ICT Centre) at UNO offices.

This Info-Sarker Phase-2 project were financed by China Exim Bank. The objectives of the Info-Sarker Phase-2 project were:

- To expand the government wide network to be established under Phase-I BanglaGovNet Project to all the District and Upazila level offices throughout the Country.
- To improve government efficiency and promote interaction between ministries/divisions, departments, districts and upazilas by construction of government ICT network infrastructure
- To use ICT system within the public administration to improve efficiency, accountability and transparency, reduce wastage of resources, enhance planning and raise the quality of services
- To maximize the automation of work processes through integrated information management system utilizing National E-Service System (NESS)
- To ensure seamless resource and information sharing between government organizations and improve delivery of services to the citizen.

Through this Info-Sarker Phase-2 project Government is willing to expand their reach up to Thana level. In Phase-II government has connected approximately 18130 selected government offices in every District and every Upazila.

Initially government has provided 18,069 Connectivity in different geographical locations which include following:

- a. 64 District x 55 Connectivity in each District = 3,520 Connectivity
- b. 487 Upazila x 30 Connectivity in each Upazila = 14,610 Connectivity

Project Scope:

The scope of the project was Long Haul and Local Loop Optical Fiber Connectivity to connect the Government Offices / Institutions in Selected District and Upazilla Headquarters. Its scope also includes expansion of National Data Center, establishing Disaster Recovery Center, Wifi Network, distribution of Tablet PCs etc.

Expand Connectivity

- Connect all government offices at the district level (on an average 55 offices for each District).
- Connect all government offices at the upazilla level (on an average 30 offices for each Upazilla).
- Backbone Connectivity from 64 Districts to 421 Upazillas (except those 64 Upazillas which have already been covered in Bangla Gov.Net project).

The Government IP network comprising NICTC, DHQ, DICTC, UICTC, and national data center would be expanded by deploying additional routers, switches and servers, etc. and new DR center would be established. The ICT backbone network will be extended to the District and Upazilla level offices. Video conference would be established up to 800 locations and 24,907 tablets would be provided to the end users.

1. Expand Capacity of NICTC, DHQ.

- a) Back-up Core Routers for each 7 Divisional HQs, 1 Medium Router for each 421 Upazillas.
- b) VPN Gateway would be deployed in NICTC to provide Internet Security Access to the govt. internal network.

2. Expand Connectivity;

- a) Connectivity from 64 Districts to 421 Upazillas (except those 64 Upazillas which have already been covered in Bangla Govt. project).

- b) Connectivity of govt. offices in 64 Districts (on an average 55 offices are considered for each District).
- c) Connectivity of govt. offices in 485 Upazillas (on an average 30 offices are considered for each Upazilla).

3. Expand Data Centre Capacity;

A modular Data Center infrastructure would be deployed in National Data Center to expand the space and capacity.

4. Establish Sub Data Centre

A sub Data Center would be deployed in Secretariat site to fulfil the local need of the ministries / divisions in the secretariat.

5. Establish Disaster Recovery Centre;

A Disaster Recovery Center would be deployed in a remote site considering the least disaster prone areas.

6. Establish Video Conference;

800 sets of Video conference system would be deployed in UNO, training centers and some other government offices. The video switching center would be deployed in NICTC.

7. Establish NOC

- a) All NMS systems would be deployed in NICTC.
- b) The TSM (Terminal Security Management) system server would be deployed in NICTC. Together with the firewalls in Secretariat and access routers (built-in firewall), the TSM system would provide the Network Access Control and Policy Management functionality.

8. Establish Wi-Fi Network;

WiFi infrastructure would be deployed in both Secretariat site and BCC.

	<p>9. Establish Training Labs; Training labs would be deployed in BCC, BTCL and 12 public/private universities, to train the Engineers in Network, Data Centre and Video Conference operation and management.</p> <p>10. Tablets Deployment 24907 Tablets would be distributed to the end users.</p> <p><u>Info-Sarker Phase-3 Project (On Going):</u></p> <p>“National Intra-Network Project for Bangladesh Government Phase – III (Info-Sarker)”, this project is an extension of the BanglaGov.Net project and Info-Sarker Phase – II project being implemented by Bangladesh Computer Council (BCC) through different foreign and GOB funding.</p> <p>The Project is also a part of “Digital Bangladesh” initiative and is intended to provide internet connectivity to the Union level through selected Nationwide Telecommunication Transmission Network (NTTN) Operators, with a view to providing internet connectivity to government offices, schools, colleges, health centers, post offices as well as to the rural people in general. Bangladesh Computer Council (BCC) under Information and Communication Technology Division (ICT Division), as the implementing agency shall act as the strategic investor to run enterprise managed by selected NTTNs (Fiber@Home Limited and Summit Communications Limited) who shall also develop the infrastructure and be responsible for service, development, installation and maintenance of the project for a period of 20 years and more. Accordingly, selected NTTNs shall bear commercial risks and success. All cost relating to the setting up of the optical fiber cable (OFC) from Upazila to Union shall be met by Bangladesh Computer Council (BCC).</p> <p>The scopes of this project is to Develop, Build, Operate and Maintain a nationwide optical fiber transmission network from Upazilla to Union level. For that purpose, Fiber@Home Limited and another one NTTN operator need to conduct Site Survey, Network Design, Underground & overhand fiber deployment work, Union level PoP preparation works, Active devices (DWDM, Router, and Switches), Passive devices (ODF & Rack), Power devices installation and commission for 2600 Unions. Carrying the access lair data traffic till central NOC will also be the part of the scopes of works in this project.</p>
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Project Highlights:

- **Name of The Project** : Development of National ICT Infra-Network for Bangladesh Government Phase-III (Info-Sarker Phase-3) Project
- **Total Budget** : US \$ 255.04 Million
 - Government of Bangladesh: US \$ 98.48 Million
 - Government of China: US \$ 156.56 Million
- **Project Duration** : 01 January, 2017 to 30 June, 2018
- **Implementing Agency** : Bangladesh Computer Council (BCC)
- **Implementation Partner** : NTTN Operators (Fiber@Home Limited and Summit Communications Limited)
- **Sponsoring Division** : ICT Division, Ministry of Posts, Telecommunications and IT

Project Objective:

- To expand existing network established under BanglaGovNet and Info-Sarker Phase-2 to 2600 selected Unions from the 4554 Unions.
- To strengthen the capacity of Union Digital Centers (UDCs) to provide connectivity to offices, schools and colleges.
- To ensure access to e-services for the rural communities of Bangladesh to achieve the goal of the National ICT Policy 2015.
- To connect the Bangladesh Police network with National ICT network to ensure seamless data communication to all levels of police units through GoB contribution.
- To support the employment generation through the use of ICT.

Project Scopes:

- Connection of 2,600 Unions from Upazila through Optical Fiber Cable.
- Realize DWDM network in 64 districts and 400 Upazilas.
- Enhance the backbone network capacity.
- Establish NMS system to monitor & manage the network.
- Establishment of 1000 police office connectivity.

- Skills enhancement through Technical Knowhow transfer.
- Foreign & local training.
- Increase employment by using outsourcing. **[FHL]**
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(b). Challenges and Opportunities on promoting broadband connectivity:

Within the scope of the AP-IS four pillars

- (1). Connectivity;
- (2). Internet Traffic & Network Management;
- (3). E-resilience; and
- (4). Broadband for all,

ESCAP member countries and partners outlined seven strategic initiatives in the AP-IS Master Plan (http://www.unescap.org/sites/default/files/pre-ods/CICTSTI1_2E_rev1.pdf) to be implemented between 2016-2018 (please refer to attached chart of AP-IS 4 Pillars and AP-IS Strategic Initiatives).

The AP-IS seven strategic initiatives are as follows:

1. Identification, coordination, deployment, expansion and integration of the regional backbone networks at the cross-border intra- and interregional levels, in collaboration with member countries and subregional organizations;
2. Establish a sufficient number of Internet exchange points at the national and subregional levels and set out common principles on Internet traffic exchange to prevent Internet traffic tromboning, decrease transit costs and improve service quality
3. Regional social and economic studies;
4. Enhancing ICT infrastructure resilience in the Asia-Pacific region;
5. Policy and regulations for leveraging existing infrastructure, technology and inclusive broadband initiatives;
6. Capacity-building; and
7. Asia-Pacific information superhighway project funding mechanism based on public-private partnerships

(c). AP-IS 7 Strategic Initiatives Implementation Plan 2016-2018: priority challenges and proposed activities

In order to match country's sub-region's and region's priorities within the scope of the AP-IS seven strategic initiatives, please complete the matrix below accordingly. Please add a row as deemed necessary.

Priority Challenges	Focus Area	AP-IS Strategic Initiatives (1-7)	AP-IS Pillars (1-4)	Remarks
<p>Priority Challenges:</p>	<ul style="list-style-type: none"> Lack of effective and adequate content availability Slow advancement of IT literacy and education at secondary and tertiary level Reaching rural or remote areas with broadband network where business prospective is not present [BTRC] 	<ul style="list-style-type: none"> (i) 5 (ii) 3 (iii) 2 	<ul style="list-style-type: none"> (i) 4 (ii) 4 (iii) 1 	
	<ul style="list-style-type: none"> Limited Broadband connection and slow speed of internet bandwidth in the rural areas. Lack of online security. Storage capacity limitation of big data. <p>[BSCCL]</p>	<ul style="list-style-type: none"> This limited internet connection can be categorised under Strategic Initiative 2. Online security is categorised under Strategic Initiative 7. Storage capacity security is categorised under Strategic Initiative 4 	<ul style="list-style-type: none"> This limited internet connection can be categorised as an issue under Pillar 1: Connectivity Online security can be categorised as an issue under Pillar 2: Internet Traffic & Network Management Storage capacity limitation can be categorised as an issue under Pillar 	

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	1. Fiber/Cable Cut. Concerned authorities should notify BTCL during road construction. [BTCL]	1. 1	1. 1	
	<ul style="list-style-type: none"> • Lack of viable business Case in terms of prospective users for broadband internet service outside Dhaka for developing local ISP services • Localized content • Coordination between different stakeholders under different ministry with priorities • Policy support for service process simplification for creating e-service. • Capacity building, ICT infrastructure and security in field level offices for e-service deployment, implementation and delivery. • Use of advanced computing and trending technologies such as Artificial Intelligence, Big data, IoT, Cloud computing, computer vision, robotics and drone for rural and national development in various sectors, climate change adaptation, disaster management and national decision making. [DoICT]	<ul style="list-style-type: none"> • 1 • 6,7 • 1,2 • 5 • 4,6 • 3,4,5,7 	<ul style="list-style-type: none"> • 1-2 • 3,4 • 1,2,4 • 3 • 3 • 3,4 	
	(i) Difficult to deploy underground Optical Fibre for metro network. (ii) Lack of skilled technical manpower. [PGCB]		(i) Deployment of underground Optical fibre can be categorised as an issue under Pillar 1: (ii) Lack of skilled technical manpower can be categorised as an	

			issue under Pillar 2	
	Installation of utility duct along all networks. [RTHD]	Co-ordination with other stakeholders of Information Communication service providers.	Connectivity	
	<p>i) Optical fiber network deployment at Cross-border areas & integration with the regional backbone network including passive infra network.</p> <p>ii) Superhighway building period, the domestic network may require relocate/rebuild due to road expansion. No compensation is given for any relocate/rebuild activities.</p> <p>iii) Internet exchange point establishment at national & sub regional levels.</p> <p>iv) Lack of Regulations and policy frameworks for ICT.</p> <p>v) Inter Govt. agencies have lack of coordination, which is impacting the permission process of ICT infrastructure build.</p> <p>vi) Power sector is considered as high focused area from Govt. side, same level of focus should be given to ICT sector.</p> <p>vii) In ICT sector, there is no proper price regulation & quality of service. Outcome is low cost with compromised quality. On the other hand, high cost with high quality, which is not affordable for</p>	<p>i) Categorised under Strategic Initiative 1.</p> <p>ii) Categorised under Strategic Initiative 1.</p> <p>iii) Categorised under Strategic Initiative 2.</p> <p>iv) Categorised under Strategic Initiative 5.</p> <p>v) Categorised under Strategic Initiative 5.</p> <p>vi) Categorised under Strategic Initiative 5.</p> <p>vii) Categorised under Strategic Initiative 5.</p>	<p>i) Categorised as an issue under Pillar 2</p> <p>ii) Categorised as an issue under Pillar 1</p> <p>iii) Categorised as an issue Under Pillar 2</p> <p>iv) Categorised as an issue under Pillar 1</p> <p>v) Categorised as an issue under Pillar 1</p> <p>vi) Categorised as an issue under Pillar 1</p> <p>vii) Categorised as an issue under Pillar 3</p>	

	<p>generalized people.</p> <p>viii) International internet market is dominated by few major purchasers, who consume 2/3 of the bandwidth. [Summit]</p>	<p>viii) Categorised under Strategic Initiative 6.</p>	<p>viii) Categorised as an issue under Pillar 3</p>	
	<p>(i) Policy Formation for engaging private organization: Currently in Bangladesh, there are multiple licenses for multiple services, like Nationwide Telecommunication Transmission Network (NTTN), International Terrestrial Cable (ITC), International Internet Gateway (IIG), Internet Service Provider (ISP) etc. for providing telecommunication transmission and ICT services. Among the licensee, there are few government organization but the private organizations are holding the ownership of majority network and services. It is important for the private organizations to have a complete policy framework for incorporating them in the initiatives taken by the UN-ESCAP.</p> <p>(ii) Utilization of existing network: A Guideline have been prepared in 2008 taking into account the objectives of the Government to create Nationwide Telecommunication Transmission Networks with a view to separating Transmission Network Services and Access Network Services in future. In this initiative, government involves the private organizations to develop the national backbone as well as last mile connectivity. According to our previous experience, BTCL and BSCCL is the only two organization were involve in these types of initiatives. As the NTTN operators has access to over</p>	<p>(i) Policy and regulations for leveraging existing infrastructure, technology and inclusive broadband initiatives;</p> <p>(ii) Policy and regulations for leveraging existing infrastructure, technology and inclusive broadband initiatives;</p>	<p>(iii) Connectivity</p> <p>(iv) Connectivity</p>	

	<p>65,000 KMs Optical Fiber Network covering entire 64 Districts and extensive PoPs presence having more than 90% nationwide coverage, UN-ESCAP can utilize these massive network infrastructure for their initiatives. This will save time and huge investment.</p> <p>(iii) Non-NTTN operators are doing Telecommunication Transmission business in Bangladesh: ANS operators are building Fiber Optic Transmission Network which is against NTTN guidelines. <i>Suggested Recourse: The said practice must be stopped by BTRC with immediate effect.</i></p> <p>Till today ANS operators are leasing out from their existing capacity to non-NTTN operator which is against the NTTN and Infrastructure Sharing guidelines. <i>Suggested Recourse: The said practice is directly affecting the NTTN business and BTRC must take immediate action to identify and stop such activities.</i></p> <p>Transmission separation. <i>Suggested Recourse: As per the NTTN guideline Clause# 3.02 the date for Transmission separation must be declared without further delay, because the total size of the NTTN networks are much bigger than any other telecom operators already and continuously expanding.</i></p> <p>ANS operators are increasing their fiber optic network & transmission capacity in the name of maintenance and last mile connectivity, which is illegal as per infrastructure sharing guidelines, Clause No: 4.7 and</p>	<p>(iii) Identification, coordination, deployment, expansion and integration of the regional backbone networks at the cross-border intra- and interregional levels, in collaboration with member countries and sub-regional organizations;</p>	<p>(iii) Connectivity</p>	
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	<p>Clause No: 4.8.</p> <p><i>Suggested Recourse: A clean instruction has to be given to the ANS operators not to increase transmission capacity or rebuild any fiber optic network in the name of maintenance.</i></p> <p><i>Also strict control on issuance of NOC for any kind of Transmission equipment import in the name of maintenance and expansion, which adversely affects NTTN business directly.</i></p> <p>Future of NTTN investment security: <i>Suggested Recourse: As because Transmission is the only business and there are already 5 licenses in the market also the price level has come down to a sick situation, considering the sustainability of the NTTN business BTRC must advise the government to keep the NTTN number to the current 5 NTTN.</i></p> <p>(iv) Optical fiber core Leasing Business: Optical fiber core leasing to ANS creates almost same situation for the industry as before NTTN. This will again cause of losing foreign currency reserve through importing multiple transmission equipment by the ANS providers. This is completely opposite of BTRC guideline and mission of making Transmission separation. <i>Suggested recourse:</i> <i>Incorporate in the sharing guidelines by BTRC, NTTNS cannot provide raw/dark fiber to any of their customers in long haul between cities countrywide. If the requirement of the client cannot meet without dark core only then NTTN operator have to apply to</i></p>	<p>(iv) Capacity-building;</p>	<p>(iv) Connectivity</p>	
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	<p>in some particular regions of the country due to sustainable demand. They are not willing to establish services in the sub-urban areas because of very low demand. For creating demand, government should aware the sub-urban population about the benefits of ICT services. This will help the operators to have a sustainable business model and eliminating the digital divide. [FHL]</p>	economic studies		
<p>Opportunities</p>	<ul style="list-style-type: none"> • Digital Bangladesh vision and established focal points for ensuring broadband for all. • Availability of government funding and policy support through Broadband Policy and ICT policy • Large and young educational workforce to engage in the digital initiatives [BTRC] 			
	<ul style="list-style-type: none"> • Surplus bandwidth from the SEA-ME-WE-5 Submarine Cable]. • Inviting for technical expertise regarding cyber securities from neighbouring countries. [BSCCL] 			
	<ul style="list-style-type: none"> • Availability of Nationwide fibre optic. • Digital friendly government. • Availability of international bandwidth. • Department of ICT, largest ICT bodies in Bangladesh has field level offices and manpower throughout the country. • Youth enthusiasm for earnings opportunity through online jobs. • Private investment capacity for entrepreneurship both in small and largescale. • Public enthusiasm for digital Bangladesh. • High rate of mobile penetration. • Demographic dividend. • International support and friendly relation. [DoICT] 			
	<ul style="list-style-type: none"> • Have an opportunity to develop connectivity with border countries to deploy a regional network. [PGCB] 			
	<ul style="list-style-type: none"> • Establishment of National backbone of IT. • Revenue Generation 			

	<ul style="list-style-type: none"> • Alternative Information channel for IT. [RTHD] • Identify regional, sub regional & national internet exchange points and build a robust network for ensuring better service for end customer. • Regulations and policy frameworks for ICT can create an enabling internet ecosystem and foster a competitive market. An expert committee to be formed to set a price level following international benchmark or slightly lower than that to ensure business sustainability along with quality. • Explore regional funding mechanisms for deployment of the Asia-Pacific information superhighway infrastructure. • Encourage for the development of ICT applications, Services & contents. • Users' Internet utilization growth rate is increasing and internet penetration along with usage pattern of Facebook and YouTube can ensure additional revenue for IIG, IX, and Tire-1 & 2 ISPs. • Video on demand and live streaming services are getting popular now a days. Recent success of Mobile TV (Bioscope) is an example. This type of app based services and interest on video contents will drive the bandwidth demand. • Call centre, Freelancing, e-commerce services increase the demand of internet bandwidth. <p>[Summit]</p>	
	<p>By implementing the initiative of UN-ESCAP, Bangladesh will get immense opportunities to get:</p> <ul style="list-style-type: none"> • Better E-Governance Platform for the Govt. of Bangladesh. • Better E-Commerce, Education and Health Care Facilitating Platform throughout the Nation. • Elimination of cluttered, unstructured & hazardous overhead cable network in Metropolitan cities. • Avoid wastage of valuable Foreign Currency reserve by not duplicating the network. • Reduce the cost of Bandwidth nationwide. • Distant learning facilities for Educational Institutions. • Crime monitoring and prevention. • Central monitoring of immigration process. • Central database and monitoring for Ministers & other Govt. affairs. [FHL] 	
Proposed solutions/actions	<ul style="list-style-type: none"> • Development of sector-specific content with sub-regional cooperation. • Prioritizing the content deployment in native language with regional cooperation • Promoting job-oriented ICT learning from secondary level. • Synchronizing wireless broadband with fiber network to reach the remote areas for cost 	

	effectiveness and wide-coverage [BTRC]	
	<ul style="list-style-type: none"> • More Investment on the infrastructure to reach the suburb people of the country. • Providing IT based training to the mass people. [BSCCL] 	
	<ul style="list-style-type: none"> • Establishment of colocation facility and express network for IIG, NIX, BWA, ISP's in outside Dhaka free for some certain periods for providing internet services to remote areas in less costs. It will create business case. • CDN facility in all the POI for efficient bandwidth utilization and future preparedness for trending video based content demand and delivery. • Establishment of free WiFi hotspots in remote areas for providing access to underserved and free public services and content delivery. • Connection in all educational institutes, community clinic and union level offices with fibre optic connectivity. • Deployment of digital repository and distribution platform for public distribution of digital contents. • Support and promote service process simplification in government services with policy, fund and knowledge. • Establishment of national Advanced computing centre and deployment of necessary infrastructure in collaboration to universities for research, promotion and expanding use of trending technologies and advanced computing for national use. • Provide training and IT support in field level service providing employees. • Establishment of Enterprise network in field level offices. • Establishment of IT operation and support centre in every upazilla. • Comprehensive effort to establish and develop content and digital media industry with all necessary supports and commitment. Investment for more localised content development. • Establishment of Digital literacy centre with connected remote education centres in all the upazilla's in all over the country. • Establishment of computer labs in rural educational institutes and teacher capacity building. • Transform coastal islands into digital islands with policy support, fund, connectivity, technology, capacity building, e-service, analytics, IOT and AI. [DoICT] 	
	<ul style="list-style-type: none"> • Shall make a Master Plan for Regional Connectivity. • Manpower/ Expertise can be exchanged within Asia Pacific Regional Countries. [PGCB] 	

	<p>Exchange of views with the appropriate stakeholders financial and technical support from ESCAP [RTHD]</p> <ul style="list-style-type: none"> (i) ICT sector should be recognized as power sector enjoying customs duty waive, Tax waive for importing goods and providing services. (ii) Fund needs to be allocated for building the ICT infrastructure. It can be a project financing/ special purpose vehicle model, Consortium model, Management contract/ build-operate-transfer, Donor financing etc. Proper & immediate financing mechanism can accelerate the ICT infrastructure implementation and development. Govt also need to encourage private/ local business entities through low interest funding and Tax waiver. (iii) Local investors should get privilege for building the ICT infrastructure in regional, sub regional & national level. (iv) Inter-governmental/ ministries support (Administrative & financial) is required to relocate/ rebuild ICT infrastructure due to road expansion for superhighway. Necessary compensation should be provided. (v) Internet bandwidth export Regulations and policy frameworks required to export internet bandwidth immediately in neighbour countries where demand exists. (vi) For ICT infrastructure building purpose, relevant ministries support is required for waiving road cutting compensation for underground works, all type of bridge crossing, using Electric pole etc. (vii) To ensure secured and more network availability, alternative path of upstream is required in additional routes. (viii) To reduce the import cost (Volume discount) of bandwidth, a forum (IIG) can be introduced to avail bulk volume discount from carrier provider. (ix) To reduce the internet capacity utilization and performance enhancement, common caching & private peering facilities needs to be ensured. (x) The co-location charge of international IX (Internet Exchange) need to be reduced for developing countries like Bangladesh. (xi) Tier-1 ISPs should provide IP routing through their lowest and best path to ensure quality. [Summit] 	
	<p>Based on the nation's requirements we have developed the solution in Bangladesh. The solution is robust and scalable to cater all the present and future service requirement. We have installed DWDM and IP devices to develop the network. We covers IP MPLS at Upazill/Union level where DWDM is in District level. Currently we are developing DWDM in every Upazillas and IP MPLS in the Union level under Info-Sarker Phase-3 project. The network is monitoring through NMS system for proactive/reactive measures in case of any link failure. We are recommending synching with the existing network if UN-</p>	

	ESCAP wishes to connect with Bangladesh. [FHL]	
<p>(d). Update to terrestrial/submarine fibre-optic cable projects: Based on the ESCAP/ITU interactive transmission map (access via link: http://www.unescap.org/our-work/ict-disaster-risk-reduction/asia-pacific-information-superhighway/asia-pacific-information-superhighway-maps), please check and list down if there is any recent fibre-optic cable project completed/planned for your country, which is not reflected in the interactive map. The input provided below will be used to update the interactive map accordingly.</p>	<p>Bangladesh has been successfully connected to the SEA-ME-WE-5 Submarine Cable system which was launched on 21st February 2017 and officially inaugurated in the country on 10th September by honourable Prime Minister. This will eventually provide Bangladesh with a bandwidth capacity of approximately 1500 Gbps. [BSCCL]</p> <p>21 POI network with 100G capacity will be included in the map. [DoICT]</p> <p>PGCB Optical Fiber (632 km) is used to connect landing station (SEA-ME-WE 5) to capital city Dhaka and few other districts [B. Baria (Ashugonj), Narasingdi, Gazipur, Sirajgonj, Pabna, Kustia, Faridpur, Madaripur, Barishal]. It is used as redundant connectivity. [PGCB]</p> <p>In the given Map, the network established by Fiber@Home Limited is missing. We have the highest number of optical fiber coverage all around Bangladesh. If we can incorporate the network with the existing coverage map, it will give more comfort to the ESCAP/ITU interactive transmission map. [FHL]</p>	
<p>(e). Any other suggestions/issues:</p>	<ul style="list-style-type: none"> • A Bandwidth Demand forecasting may be made for next 10 years for Asia Pacific Region. • A policy can be formed to exchange Skills manpower within Asia Pacific Region. [PGCB] • Optical fiber cable has to be installed at various sections (currently unavailable) to complete Bangladesh portion of TAR network. • Economic life of 1600 KM OFC of Bangladesh Railway will end in 2028. (Considering economic life span of OFC 20 years). So, 1600 KM OFC needs to be replaced in 2029. • (Economic life of 409 KM OFC of Bangladesh Railway will end in 2023-2024. (Considering economic life span of OFC 20 	

	<p>years). So, 409 KM OFC needs to be replaced in 2024-2025. [BR]</p>
	<p>Asia-Pacific Information Superhighway broadband connectivity plan can be designed considering the existence of POI having colocation facilities in Bangladesh [DoICT]</p>
	<ul style="list-style-type: none"> • Asia-Pacific Information Superhighway Regional Cooperation Framework document needs to be established with the cooperation/ collaboration of all member countries, partners. • AP-IS steering committee meeting need to perform in regular basis (at least 1 or 2 meeting in a year). • All the decisions should be executed with close monitoring of AP-IS steering committee members. • There should be a policy that encourages local investors to build ICT infrastructure. [Summit]
	<p>Why do we care about information communication technologies (ICT) infrastructure in the context of the next round of UN sustainable development goals? Expanding affordable access to ICT infrastructure has become a priority for policy makers because they are important enablers for social inclusion and economic development. With the Internet being such an important resource in the modern world, broadband has become a vital platform that helps boost economic growth and has the potential to lift people out of poverty (e.g. a World Bank 2009 study showed a 10% increase in broadband penetration increased GDP growth by 1.34% in low to medium income countries). Not only does it help firms' productivity, but also health, education and government services can be delivered through this platform. Therefore, there is a strong case for governments looking to the next set of global targets to include broadband access.</p> <p>Bangladesh is lagging in terms of ICT infrastructure compared to the average of developing countries, as well as to its regional peers. For instance, in 2013 it had less than half the amount of people using the Internet than India (i.e. India had 15.3%, Pakistan 10.9%, and Bangladesh only 6.5% of individuals). Only 4.6% of households had Internet access in Bangladesh compared to an average of 28% of households in developing countries and 76% in developed economies. Furthermore, Internet connections exhibit about half the speed than connections in Sri Lanka (i.e. 1.8 Mbps versus 3.4 Mbps, according to Akamai data).</p> <p>The initiative will extend benefits on a macro-level through employment generation, imparting technical skills and bringing in foreign investments that will boost foreign reserves. People witnessed the outcome of establishing telecommunication infrastructure and connectivity when honorable Prime Minister Sheikh Hasina recently exchanged views with rural people of Chittagong and Rajshahi divisions on anti-militancy issue. Nearly 3 million people of villages listened to the speech of the premier. We think it's a glaring example of establishing connectivity. Moreover she is continuously continuing video conferencing at different level of local government as well as administrative channels where she is giving her directives for the overall development of the country as well as taking feedbacks from them. These have given a new dimension and motivation to the administrators and local citizen who can directly interact with the</p>

	<p>honourable prime minister.</p> <p>The optical fiber infrastructure established by Fiber@Home Limited has been making important contribution to flourishing information technology and increasing creating awareness about it. This initiative in building 'Digital Bangladesh' has added a new dimension to the progression of information technology in the country.</p> <p>The government is committed to taking Bangladesh to a new height. The stair of fulfilling that aim is 'Digital Bangladesh'. By utilizing FHL's nationwide optical fiber infrastructure, the government has ensured construction of infrastructure and reaching information technology service to far-flung area. Service is now available at the remotest corner of the country. Even information technology services developed in Bangladesh are being exported to more than 30 countries in the world. Information technology is now the source of livelihood of several lacs of people, employment-friendly of more than four crore people, a reflection of people's education, health and availability of other services. [FHL]</p>
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