Improved Regional Fiber Connectivity via Digital CASA: The Opportunity for Central and South Asia

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PART I:
THE BANDWIDTH DIVIDE
International Internet Bandwidth, YE14

- Russian Federation: 4,000 Gbps
- Kazakhstan: 500 Gbps
- Uzbekistan: 20 Gbps
- Kyrgyz Republic: 15 Gbps
- Tajikistan: 5 Gbps
- Afghanistan: 15 Gbps
- Turkmenistan: 1 Gbps
- Azerbaijan: 340 Gbps
- Turkmenistan: 1 Gbps
- Uzbekistan: 20 Gbps
- Kyrgyz Republic: 15 Gbps
- Tajikistan: 5 Gbps
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- Afghanistan: 15 Gbps
Int’l. Internet Bandwidth per Capita (Kbps)

Source: Terabit Consulting

THE BANDWIDTH DIVIDE
Less than 10 Kbps:
SERIOUS OBSTACLE TO DEVELOPMENT

Many Western European markets: >100 Kbps per capita
Wholesale Bandwidth Prices

- Wholesale bandwidth prices are 10 to 100+ times higher in Central Asia than in America or Europe

Wholesale Transit Pricing per Mbps ($USD)

Source: Terabit Consulting
Consumer Internet Prices

- Internet subscriptions in many Central & So. Asian markets: unaffordable to the majority of the population
- High international bandwidth costs are a primary cause

1 Mbps Internet Subscription as % of Per-Capita GDP

Source: Terabit Consulting
PART II: INSUFFICIENT REGIONAL BANDWIDTH INFRASTRUCTURE AND ITS EFFECTS
Weak Regional Infrastructure

- There are no coherent, purpose-built, cost-effective pan-regional fiber optic networks for Central & South Asia.
- International connectivity consists of bilateral, point-to-point, closed-access trans-border links.
- International connectivity via these links is:
  - Extremely expensive
  - Low-capacity and not technologically-competitive
  - Unreliable
  - Subject to great political risk.
The Impact of Low International Bandwidth & Weak International Infrastructure

• At the macro level: a major obstacle to economic and human development
  – Detachment from digital economy
  – Continued economic inefficiencies and restrained growth
  – Lack of access to critical social development tools including telemedicine, distance learning, scientific/research networks
  – Prevents regional integration within the aegis of knowledge-based economic development

• More specifically within the telecom environment: higher wholesale and consumer prices, and lower broadband adoption rates
PART III:
THE BENEFITS OF
IMPROVED FIBER CONNECTIVITY
FOR CENTRAL ASIA AND SOUTH ASIA
Improved Regional Fiber Connectivity: Telecom Benefits & Opportunities for Cent. & So. Asia

1. Would bring lower-cost, higher-volume bandwidth
   • Digital CASA would improve the region’s access to bandwidth hubs in Russia, Europe, and China

2. Would increase reliability of int’l. connectivity
   • Additional fiber connectivity decreases the likelihood of network outages

3. Would increase value of domestic networks
   • The region’s domestic fiber is essentially “stranded” by a lack of international connectivity; the value of this infrastructure will increase exponentially according to the number of connections (Metcalfe)

4. Would present a stronger opportunity for the sale of transit capacity to neighbors & share of Europe-Asia
   • Digital CASA would allow for the region’s countries to efficiently export bandwidth to neighboring markets (in Phase I), and also to capture a share of the lucrative Europe-to-Asia transit market (currently in excess of 15 Tbps)
The global telecommunications industry is **desperate** for a cost-effective solution that would avoid undersea choke points. Digital CASA could be an alternative.
1. Benefits to consumers and end-users
   - Improved regional connectivity would reduce end-users’ unit costs per Mbps, increase their Internet throughput and reliability
   - This would greatly enhance the utility and value of each country’s Internet infrastructure and promote the growth of the digital economy

2. Economic growth
   - Improvement in ICT infrastructure yields:
     • Increased demand for the output of other industries (demand multiplier)
     • New opportunities for production in other industries (supply multiplier)
     • New goods and services for consumers (final demand)
   - It also increases firms’ innovation capabilities and increases the probability of new products, innovations, and organizations
3. Increased government revenue
   - Growth in economic output from ICT investment results in greater tax revenue
   - Increased employment in the telecommunications sector
   - Greater collections from telecom licenses and excise
   - Rent collections from transport and utility ROWs

4. Regional stability through better international and intercultural relations
   - More efficient routing of trans-border traffic would encourage trans-border initiatives in the education, healthcare, and research sectors that would not otherwise be possible.
   - Telecommunications networks are a key element of regional integration
PART IV: STRATEGY FOR IMPROVING REGIONAL FIBER INFRASTRUCTURE
Principles to Guide Future Network Development

1. Developed to function and be monitored as a single, uniform network
   – Existing multi-national terrestrial networks cannot offer uniform quality-of-service guarantees between endpoints (as good as “weakest link” or “weakest operator”).

2. Leveraging existing infrastructure
   – Right-of-way procurement and uniform construction techniques would be enabled through the use of linear infrastructure such as the highways (ESCAP Asian Information Superhighway), railways, or energy transport and transmission infrastructure.

3. Fully integrated and coherent
   – Redundant ring or mesh architecture would allow for in-network healing in the event of physical cable outages or instability affecting connectivity in specific countries.
Principles to Guide Future Network Development
(Continued)

4. **Cost-effective**
   - With suitable transmission capacity and fiber count, a pan-regional terrestrial fiber network could compete effectively with submarine cable on both a regional and intercontinental basis.

5. **Open access and non-discriminatory pricing**
   - In order to achieve development and policy goals, as well as to serve the region’s consumers, all purchasers of capacity must be able to access the network on an equal, non-discriminatory basis.

6. **Developed, managed, and operated within a special independent framework to meet policy goals**
   - A framework to ensure the neutrality and efficiency of the network
   - Should allow participation by all stakeholders while still maintaining arm’s-length terms over all capacity sales and leases.
Options for Regional Network Development

- Strategy for the Improvement of Central and Southern Asian Terrestrial Fiber Optic Connectivity
- Construction of a Coherent Regional Terrestrial Fiber Network
- Continued Use of Fractured, Bilateral Terrestrial Fiber Infrastructure
- Intervention by World Bank Group / Government to Facilitate Implementation
- Marketplace Left to Implement Its Own Coherent Solution
- Government Ownership and Project Management
- Choice of Project Design and Engineering, Supplier, Maintenance Authority, Operational Plan
- Special Purpose Vehicle (SPV) with Govt./WB Shareholding (Investment)
- Special Purpose Vehicle (SPV) with Govt./WB Contribution (Subsidy)
- Build-Operate-Transfer (BOT)
- Public-Private Partnership (PPP) / Private Sector Project Management
- Project Management Contract
Parallel Downstream Policy Initiatives for Bandwidth Success

1. Truly independent and transparent regulatory environment
2. A strong commitment to competition and open-access, non-discriminatory tariff frameworks throughout the entire telecommunications ecosystem
   • Not only international bandwidth and IP transit
   • Backhaul, interconnection, domestic transport, and access networks
3. Local-loop unbundling, as well as antenna and tower site sharing, to ensure competitive service offerings to end-users
4. Promotion of public Internet exchanges to more efficiently interconnect domestic operators and prevent “hairpinning” of domestic and/or regional traffic via international transit paths.
   • By encouraging private-sector IXP participation as well as requiring government entities (and possibly educational and research networks) to participate in IXPs
Thank you!

Intelligence, Analysis, and Forecasting for the International Telecommunications Infrastructure Community

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