Brainstorming Broadband: Developing a Roadmap for India
Broadband essential for growth & productivity

The citizens’ need to data access is CRITICAL to Life & Lifestyle

- Enables access to quality education, health, government services, etc.
- 10% increase in broadband penetration rate helps enhance per capita GDP of a nation by about 1.4%

Source: World Bank
High Focus on Broadband Infrastructure

151 Countries focus on national broadband plans

Indian Govt focus on Digital Infra High
Private sector responding to Data consumption growth

Sustainable, fiberized Smarter Networks is the need of the hour

Source: The state of broadband 2016 report & Sterlite Estimates
Sterlite Tech’s end to end solutions deliver Smarter Networks

Only global company to have Smarter Network Solutions across Products, Services and Software

OPTICAL COMMUNICATION PRODUCTS

NETWORK & SYSTEM INTEGRATION

SOFTWARE & SERVICES

Transforming everyday Living of people

Sterlite Tech: Transforming Everyday Living by Delivering Smarter Networks
Case studies towards delivering Smarter Networks

**MPLS**
Core / EDGE MPLS network and 0.5 million lines broadband deployment in Delhi / Mumbai

**NFS**
Protecting nation’s borders with end-to-end execution of secure communication in Jammu and Kashmir

**Smart Cities**
India’s first Smart City Solution: End to end implementation for Gandhinagar & Jaipur

**FTTH**
Urban Infrastructure of 165,000 fibre connected homes across 6 cities

**Billing**
Elitecore OCS empowers TIME customers to check their balance in real time & get notified of their usage, eliminating “Bill Shock”
Serving customers in 100+ countries

Sterlite Tech is an Internationally approved supplier for Top Global Companies
The Impact of FTTx in India
Customer First: Quality of User Experience, Rural or Urban

• Low latency upload and download → customer satisfaction, monetization

• High speeds per user → adoption & growth of broadband across the country

• A network that is always up & reliable → value for money

• At the right price points → affordable

Fiber has the least down time, lowest cost per GB and can provide services to very high data usage customers. Fiber roll-outs in India need to match the surge in data consumption as well as digitization initiatives that are under-way.

Source: Deloitte, 2016
AP FIBER GRID

Vision: To establish a highly scalable BB network infrastructure,

- accessible on a non-discriminatory basis, to provide on demand, affordable and end-to-end broadband connectivity of 10 to 20 Mbps for ALL households and 1 to 10 Gbps for all institutions.

- AP found unique way to built large scale last mile FTTH network to connect each every hone in the state with optical fiber

- GPON Technology using multiple splitting

- Quick deployment last mile connectivity solution for faster roll-outs

- Partnering with LCOs/MSOs to reach House Holds/Govt. institutes

Launched with 100% Fiber Connectivity in Mori village
How do we get there: End-to-End Infrastructure Manager

• A managed service provider is needed to ensure end-to-end infrastructure reliability, uptime via SLAs
  • Essential to ensure network is “always available”
  • Monetization, tenancy etc..

• Design, build & manage a complete network – Actives & Passive
  • Stitching together a complete solution involving components from multiple vendors and agencies.
    • Block to GP fiber, is owned by BBNL;
    • district to block fiber may belong to BSNL (or other Telcos);
    • switching/routing equipment may be supplied by OEM 1
    • GPON may come from OEM 2, WiFi from OEM 3, etc.

• Develop and enforce a “Standard” Infrastructure Delivery Model / Template
  • Best global practices in design and deployment
  • Ensure accountability via a standards based governance model
## Study Objectives and Methodology

### Objectives:
Understand challenges and best practices in fiber network design and build

### Methodology:

**Primary interviews**
- Indian Telco Technology organization
- Global design and deployment companies
- Strategy consultants and Sterlite experts

**Fiber network health monitoring data**
- Network health data of key Telcos in India analysed to derive key insights

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## Study Dimensions

1. Network design practices
2. # of cuts in fiber networks and its impact on network life
3. Passive network redundancy practices
4. Active network redundancy practices
5. Network traceability
Higher number of cuts in fiber network results in lower life

## # of Cuts per 1,000 kms per Month (Intra-city average)

- **International Benchmark**: 0.7
- **Indian Telco 1**: 15.0 (+1700%)
- **Indian Telco 2**: 12.0
- **Indian Telco 3**: 14.0

## OFC Network Attenuation Life (in years) (doubling of link attenuation)

- **Australia**: 30
- **U.S.**: 25
- **India Telco 1**: 8
- **India Telco 2**: 10
- **India Telco 3**: 8 (-67%)

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**Indian Telcos have 2-3 times faster fiber network CAPEX replacement cycle compared to global benchmarks**

Source: Results from STL network health monitoring project or shared by Telco
International benchmark data sourced from partners working with those Telcos (includes Australia, Western Europe, U.S.)
Network life simulation model output: How important is cable cut, all other factors being equal?

Bringing cuts from 15/m/kfkm to 5/m/kfkm adds 12-14 years life @75% failure
Passive network redundancy

<table>
<thead>
<tr>
<th>Network Type</th>
<th>Current Duct Configuration</th>
<th>Problem</th>
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</table>
| NLD          | 1+1                       | 1. Duct repair is not a common practice in India  
2. Therefore, spare ducts become un-usable after 4-5 years due to frequent cuts and soil penetration |
| Intra-city   | 1+2                       | 5%-10% improvement in CAPEX productivity due to duct planning optimization |
| FTTH         | 1+1                       |         |

Source: Primary interviews
# Active network redundancy

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<th>Network Type</th>
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<td>Access</td>
<td>1+1</td>
<td>1. High number of cuts force planners to build redundant logical routes</td>
<td>Highly reliable network can eliminate the need for redundancy CAPEX</td>
</tr>
<tr>
<td>Aggregate</td>
<td>1+1</td>
<td>2. This increases the active transport CAPEX significantly</td>
<td>• Global installation and PMO practices</td>
</tr>
<tr>
<td>Core</td>
<td>1+2 or 1+3</td>
<td></td>
<td>• SLA based O&amp;M for network built to global standards</td>
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20%-30% improvement in Core Transport network CAPEX productivity due to improved network reliability
Network Traceability
(after 5 years)

> 30% of network is not traceable

Telco 1

> 40% of the network is not traceable

Telco 2

1. Limited network traceability (no single source of truth) as planning, deployment and O&M is done by different organizations
2. GIS based planning and single partner can help improve network traceability

Source: Primary interviews
A holistic design, build and management framework is essential

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<th>Challenge</th>
<th>Impact</th>
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<td>Multiple agencies without clear end-to-end accountability</td>
<td>Gaps in SLA management</td>
<td>End-to-end infrastructure manager</td>
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<td>High cuts leading to lower life</td>
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<td>Passive network redundancy</td>
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Discussion/ Q&A
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Write to us
communications@sterlite.com