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Hyperscale Network Modernization

Fibre Rollouts in India

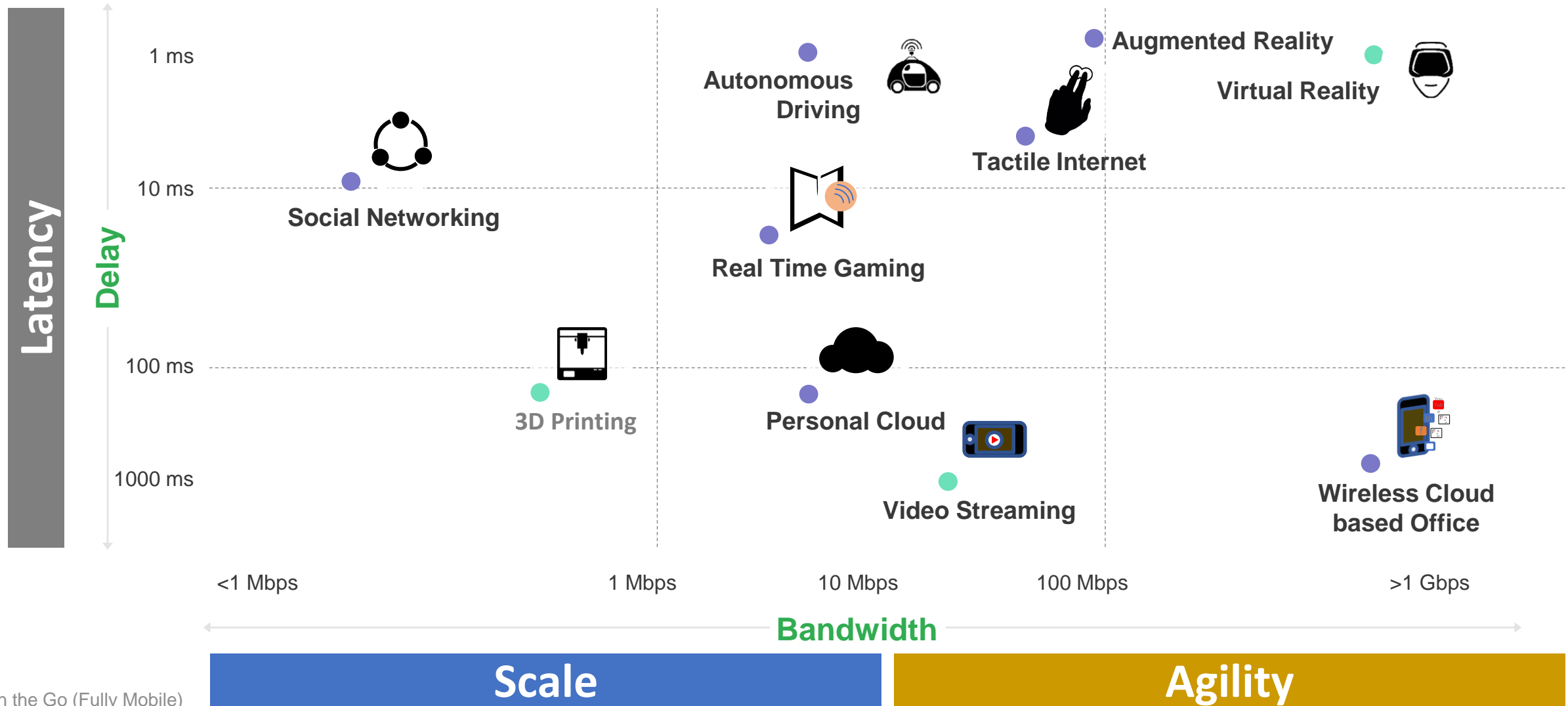www.sterlitetech.com

KS RAO
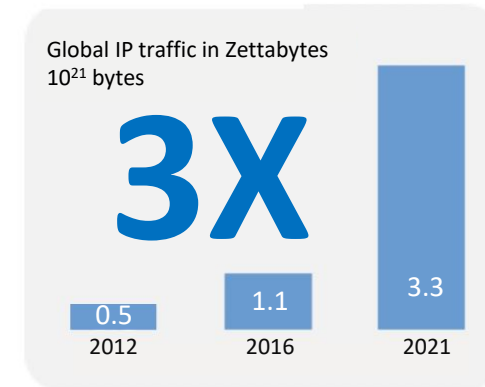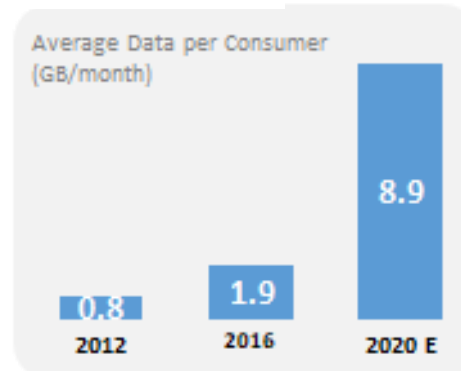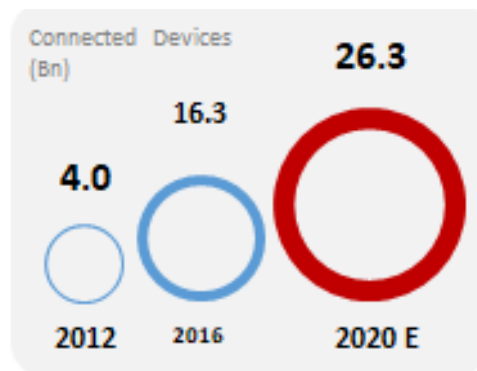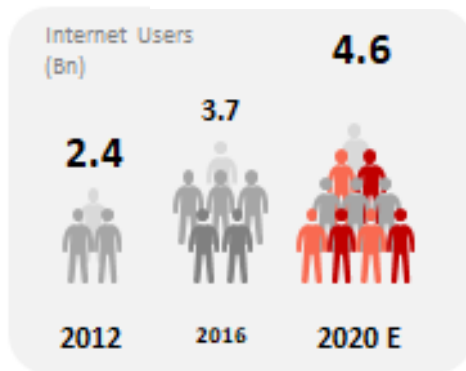**CEO – Telecom Services Business**
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What we'll talk about today

- **The need for hyperscale network modernization**

- The challenges we face

- A holistic approach

- Why fibre should only be deployed by experts!

An expanded ecosystem of apps requires hyperscale

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Latency

Delay

1 ms

10 ms

100 ms

1000 ms

Augmented Reality

Virtual Reality

Autonomous Driving

Tactile Internet

Social Networking

Real Time Gaming

3D Printing

Personal Cloud

Video Streaming

Wireless Cloud based Office

<1 Mbps   1 Mbps   10 Mbps   100 Mbps   >1 Gbps

Bandwidth

Scale   **Agility**

● On the Go (Fully Mobile)

● Nomadic (Fixed Access with Limited Mobility)

Beyond apps – Devices and usage take us to triple zettabytes

2X Internet Users × **7X** Connected Devices × **22X** Data per Consumer = **HYPERSCALE**

Internet Users (Bn)
- 2.4 — 2012
- 3.7 — 2016
- 4.6 — 2020 E

Connected Devices (Bn)
- 4.0 — 2012
- 16.3 — 2016
- 26.3 — 2020 E

Average Data per Consumer (GB/month)
- 0.8 — 2012
- 1.9 — 2016
- 8.9 — 2020 E

Global IP traffic in Zettabytes 10^{21} bytes

3X
- 0.5 — 2012
- 1.1 — 2016
- 3.3 — 2021

Deep fiberization will be the natural next step

Fibre consumption (fkm) per capita

United States: 1.57
China: 1.14
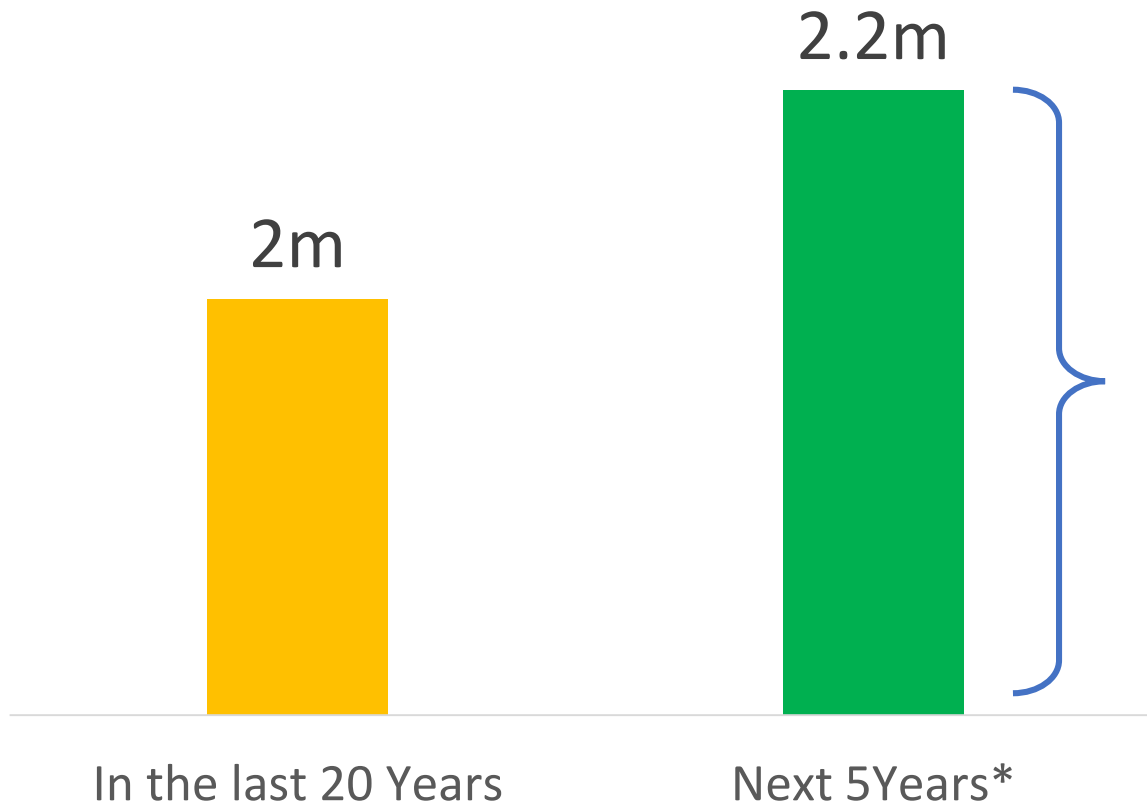India: 0.10

15X
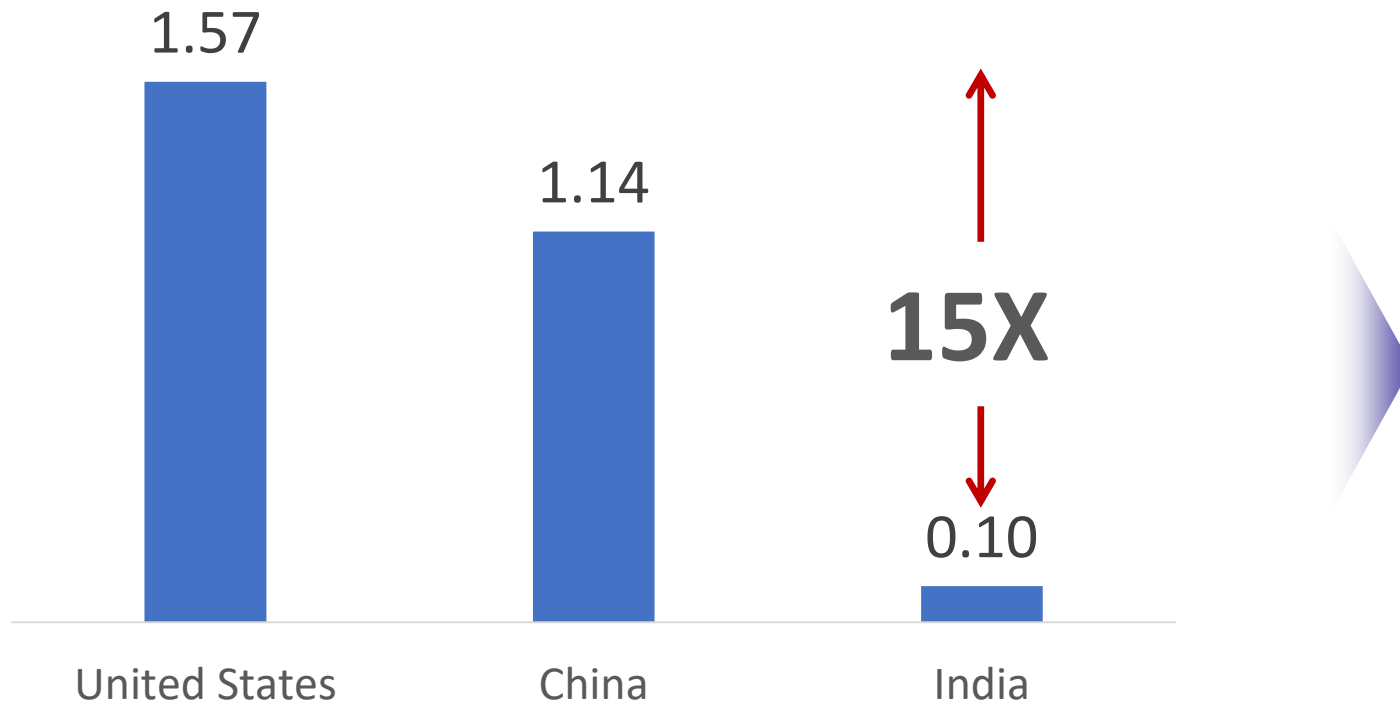
Deep fiberization
helps in:

Bridging digital divide

Increasing digital literacy

Improving consumption experience

India has been on the journey of deep fiberization

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Cable-KM Deployment in India

2m

2.2m

In the last 20 Years

Next 5Years*

5 years: India needs to deploy the next **2.2 million km** at

~5X speed

India's deep fiberization journey has started.

And the path has many challenges

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India offers some unique challenges

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| Shallow trenches ½ meter? | | Poor trench bed preparation | | Information not available |

| Rock conditions | | Open manholes |

Lets understand these challenges

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Top 5 challenges as per our survey

- 27%
- 25%
- 23%
- 14%
- 11%

- Multiple approvals
- No visibility of existing utilities
- Unskilled manpower
- Improper survey
- Localised vendors
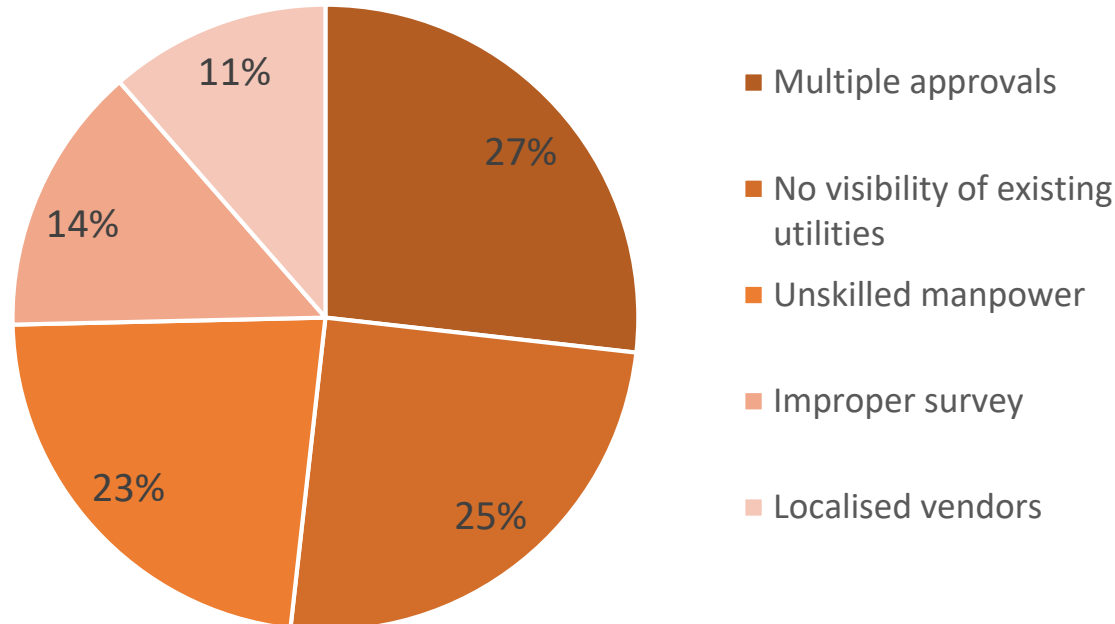
STL view on top challenges
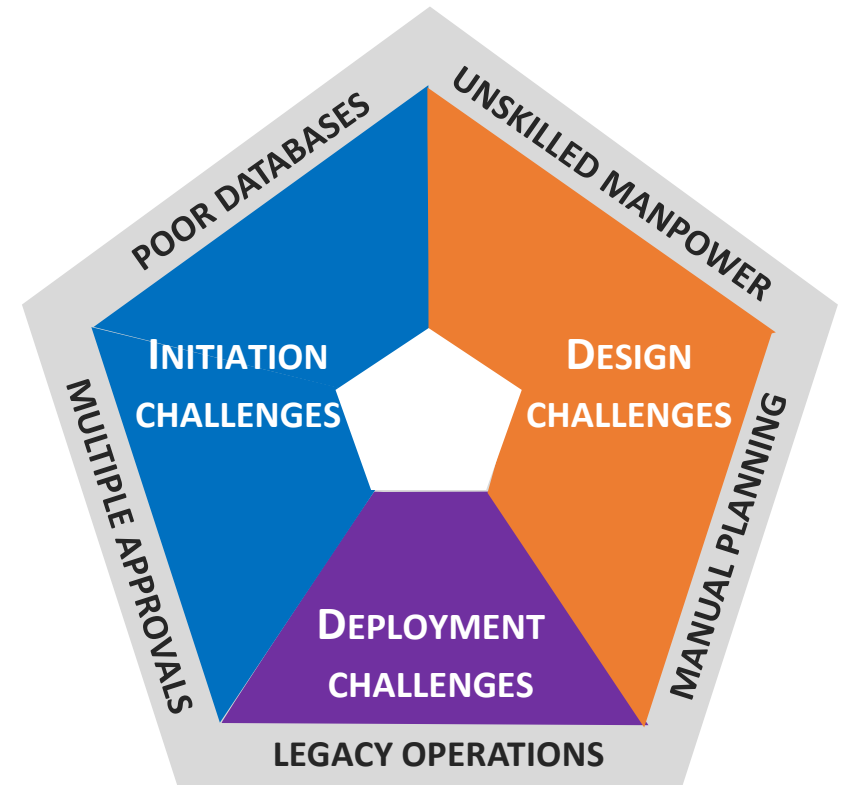
POOR DATABASES

UNSKILLED MANPOWER

MULTIPLE APPROVALS

MANUAL PLANNING

INITIATION CHALLENGES

DESIGN CHALLENGES

DEPLOYMENT CHALLENGES

LEGACY OPERATIONS

What we'll talk about today

- The need for hyperscale network modernization
- The challenges we face
  a. Initiation Challenges
    I. **Multiple Approval**
    II. Poor Databases
  b. Design Challenges
  c. Deployment Challenges
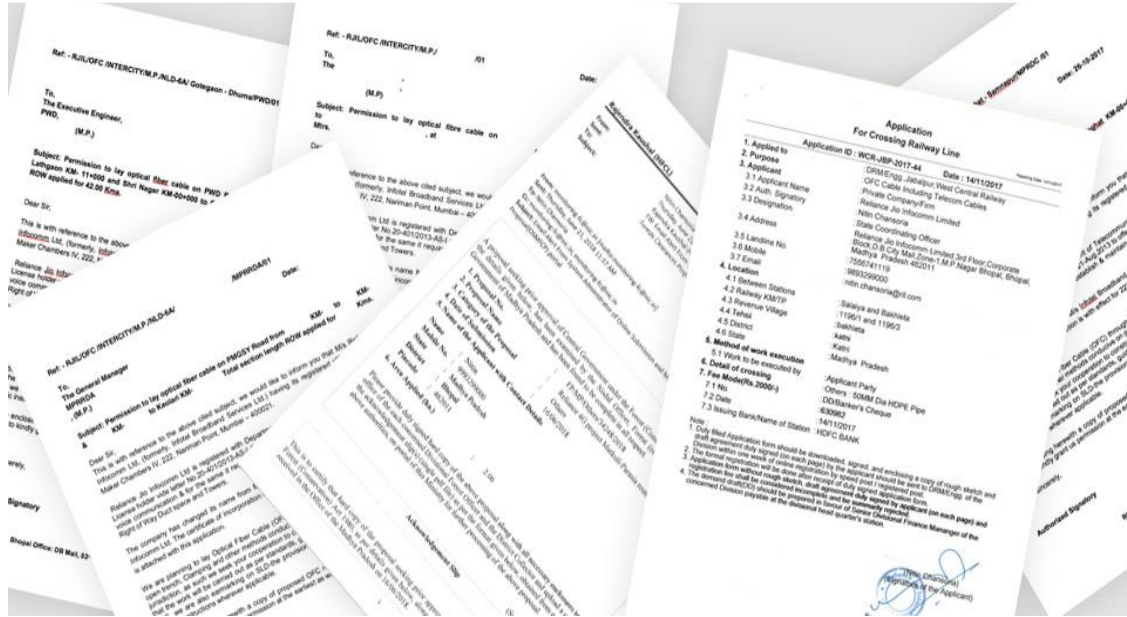- A holistic approach
- Why fibre should only be deployed by experts!
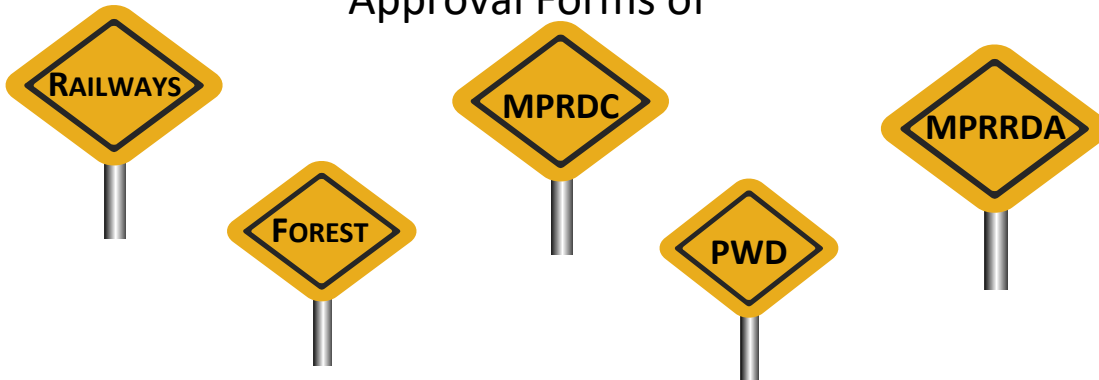
Challenge:
Multiple approvals and agencies

Impact:
Delays that take twice the execution time

Multiple approvals and agencies lead to delays

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CHALLENGE

Approval Forms of

RAILWAYS

FOREST

MPRDC

PWD

MPRRDA

SUCCESS STORY

To achieve deep fiberization faster, some state governments have instutionalized

RoW blanket approval

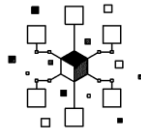SLAs clearly defined

Online project monitoring

Minimum touch points

Lean-Agile Approvals Approach

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L
LEAN-AGILE APPROVALS

LEAD 360°

Minimum Touch Point

Faster Deployment

Accelerated Readiness

- Leverage technology to build approval process and databases

- Workflow system for permission reminders

- Disciplined delivery, close follow-ups and empowered managers across all milestones

- Take blanket approvals across state and central agencies

  o Nodal agency for RoW permissions

  o Single window clearance

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- A holistic approach
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Challenge:
Poor database of utilities. Improper survey techniques

Impact:
Major cuts that slow down and disrupt other utilities

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CHALLENGE

No visibility of already laid existing utilities

Risk of damaging existing utilities

SUCCESS STORY

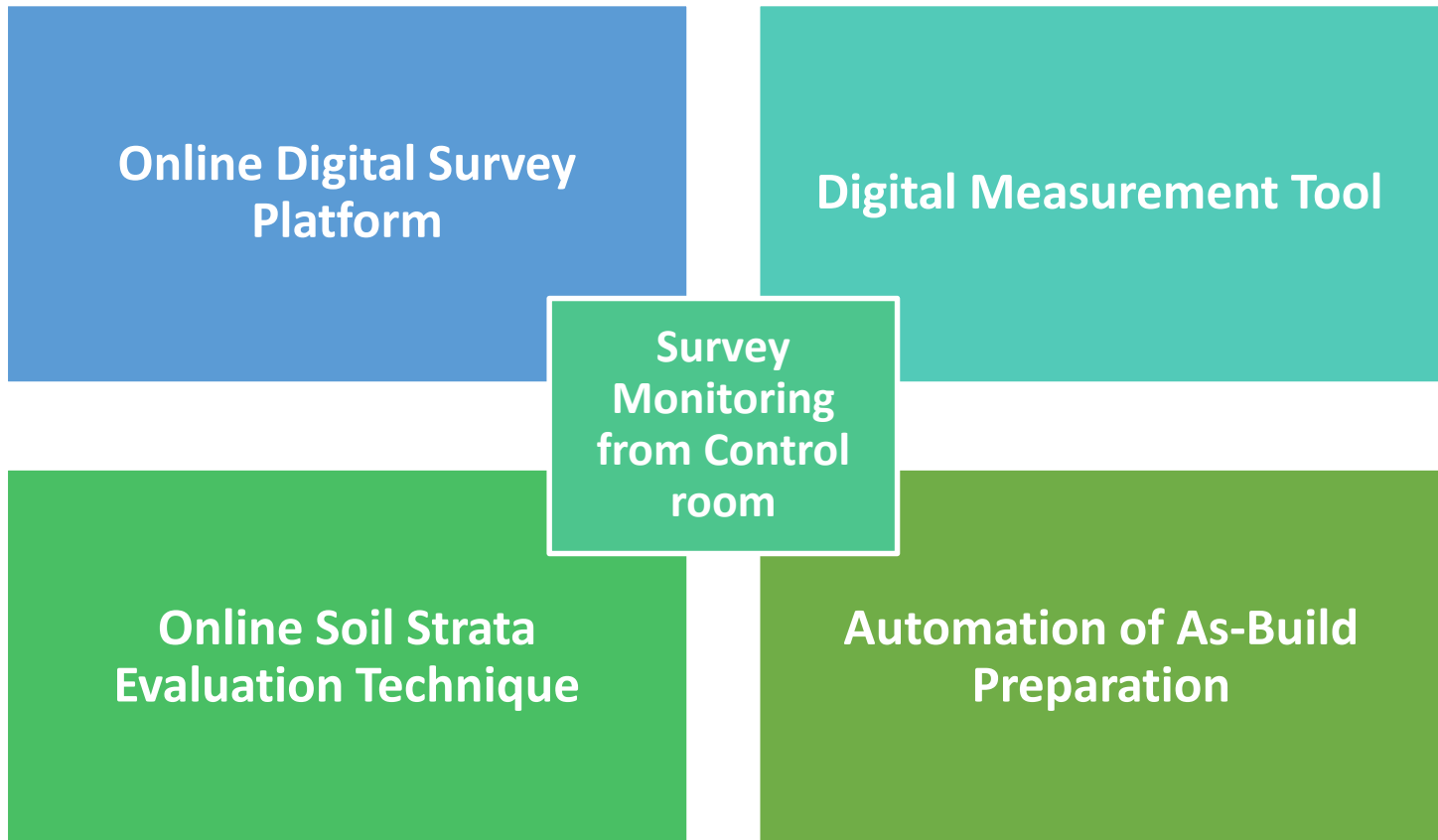**1. GIS databases for new utilities**
Next step -> central repository

2. GPR system 3D imaging radar array to map existing utilities

Everything Survey

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E
EVERYTHING
SURVEY

LEAD 360°

- Route survey, soil strata survey, database and vendors
- Partner with RoW authorities for **centralized database** for utilities

Online Digital Survey Platform

Digital Measurement Tool

Survey Monitoring from Control room

Online Soil Strata Evaluation Technique

Automation of As-Build Preparation

Faster Deployment

Safe Deployment

Optimised Planning

What we'll talk about today

- The need for hyperscale network modernization
- The challenges we face
  a. Initiation Challenges
  b. Design Challenges
     I. **Unskilled Manpower**
     II. Manual Planning
  c. Deployment Challenges
     I. Legacy Operations
- A holistic approach
- Why fibre should only be deployed by experts!

Challenge:
Unskilled manpower

Impact:
Less than 50% productive hrs per day

Scarcity of skilled manpower

Non adherence to defined SOPs

- Lack of business etiquette
- Non diligence

Decreases productivity

- Lack of work discipline
- Unprofessionalism
- Uncertified professionals

Safety concerns

- Don't adhere to safety procedures
- Don't raise safety breaches, if any

Academically skilling on best deployment practices

2500+
Certified professionals

Trenching   Ducting   Backfilling   Blowing   Splicing

Sterlite Program Management Certification

What we'll talk about today

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  - a. Initiation Challenges
  - b. Design Challenges
    - I. Unskilled Manpower
    - **II. Manual Planning**
  - c. Deployment Challenges
- A holistic approach
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Challenge:
Manual planning and tracking

Impact:
Wrong machines deployed, resources wasted

Manual planning leads to exaggerated risks and unknowns

- Lack of control

- Inefficient resource planning

- Non real time progress update

- Incidental risks

- Machine breakdown

- Geopolitical risks
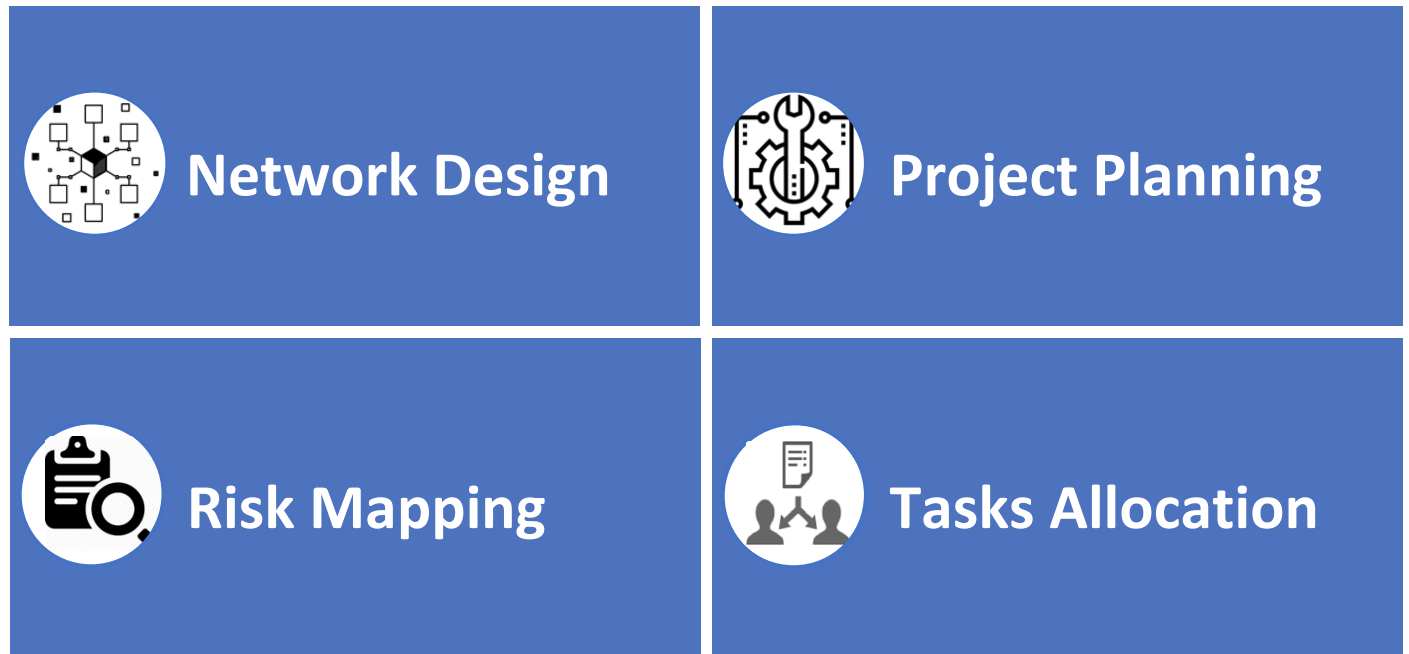
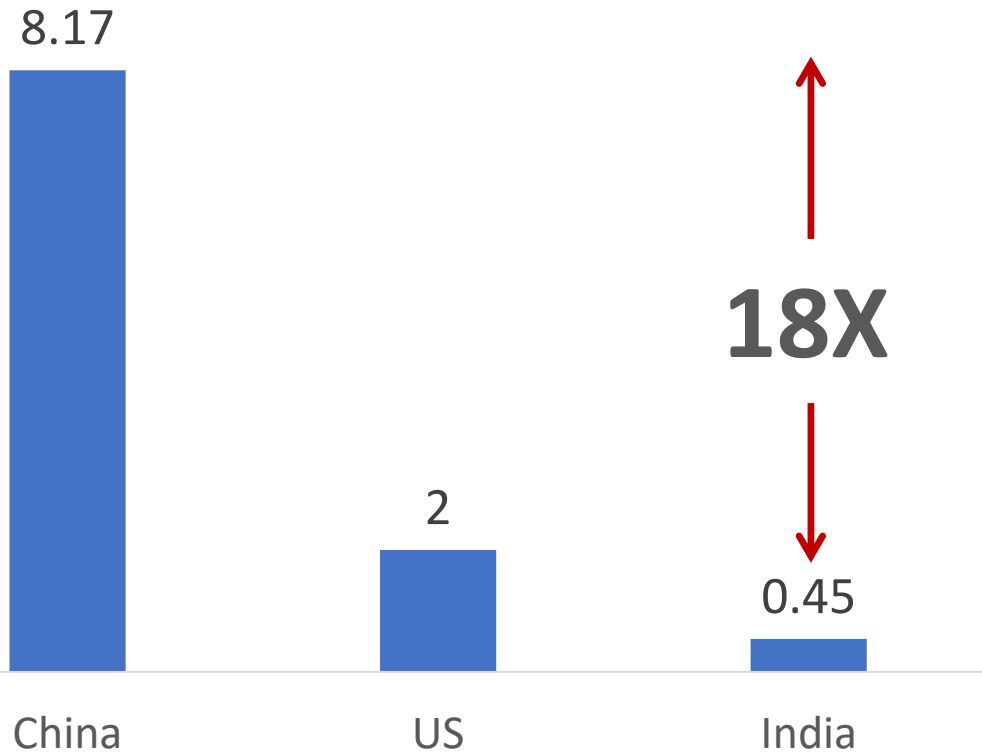# Overcoming manual planning by
Design-led planning

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D
DESIGN-LED PLANNING

LEAD 360°

Comprehensive Design

Lower Risks

Optimised Planning

Network Design

Project Planning

Risk Mapping

Tasks Allocation

Design recommendation: Utility Corridor

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Cable-km/Road-km

Bar chart values:
- China: 8.17
- US: 2
- India: 0.45

18X

Design Recommendation

- **Build a Utility corridor**
  - Common Utility Ducts in Tokyo, Yokohama, Qatar, GIFT City (Gujarat)…
  - Need to do it at a city, state level

Benefits

- **Cost optimised**
  - Cost of fibre rollout = 0.5 - 2% of road construction
    - Cost to construct roads ~ INR 4 – 20 crores
    - Cost to lay fibre ~ INR 0.1 crore
- **Minimal disruption to citizens**
- **Faster deployment of network solutions**

> **Fibre along with road infra – The ultimate solution**

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  c. Deployment Challenges
  - I. **Legacy Operations**
- A holistic approach
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Challenge:

Legacy daily operations management

Impact:

Low productivity

Cost – Quality – Time

Legacy led low productivity is overcome by 360 degree robust operations

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360°
ROBUST
OPERATIONS

LEAD 360°

Daily rigor

Latest tech

Partner ecosystem

1 Daily operations management and incentives

2 Project tracking via FFMS

3 Well managed partner ecosystem

4 Modern tech such as high speed trenching

360 Robust Operations

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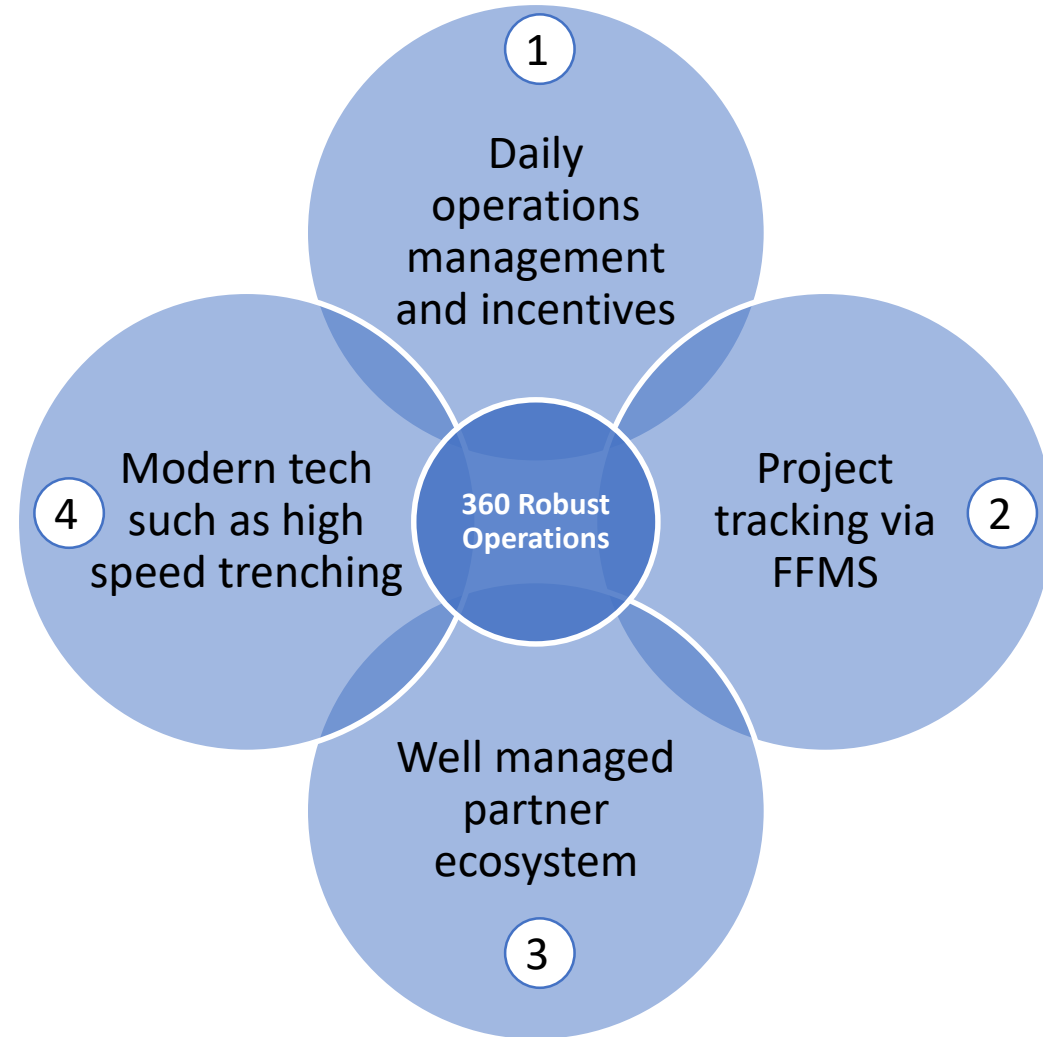
Legacy Daily Ops

- People based machine operating procedures

- Incentive paid for fibre cut fixing

- No time delay based reviews and recognition

360° Operations approach for daily operations management

Standardized operating procedures

Incentives for no cut fibre

Recognition for before time completion

Continuous review of work

27

Automation in project tracking

Industry prevailing project tracking

Attendance on phone

Manipulation of current location

Manual reports

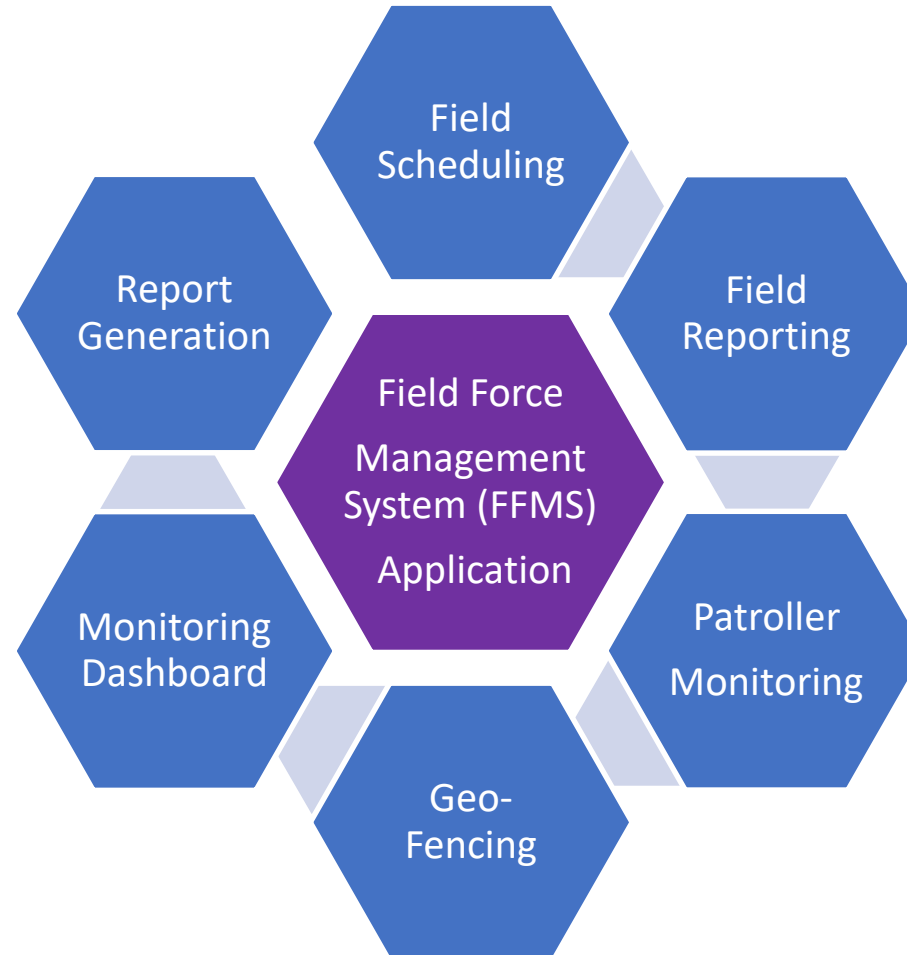Real time project status

360° Operations approach for real time project tracking

- Field Scheduling
- Field Reporting
- Report Generation
- Field Force Management System (FFMS) Application
- Patroller Monitoring
- Monitoring Dashboard
- Geo-Fencing

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Legacy Vendor Mgmt

- Transactional choice of vendors

- No long term relationship

- No investment in vendor team training

- No softer relationship building

360° Operations approach for partner management

Empanelment criteria

Incentive based pay

Motivated team

Partners outreach

Capability development

Performance improvement

Transforming the speed of deployment process

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Prevailing trenching practices in India

- Manual trenching

- Trenching at shallow depth

- Open trench

- Inappropriate back filling

360° Operations approach for high speed trenching and audit

High Speed Trenching

- 10X faster high speed trenching
- Auto duct laying technology
- Customised attachments for machines and tools

Better quality trenches ▶ Network longevity
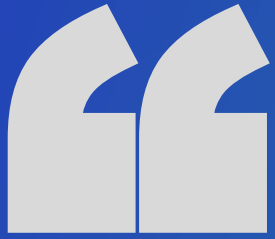
FTR   Speed   Low Cost

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INTRODUCING

STL's unique **LEAD*360*°** approach to Hyperscale Network Modernization unifies the potential of software-defined network design, high density 5G-ready fibre solutions, experience based detailed deployment capabilities – to provide orchestration and highly scalable networks!

LEAD360°

A Transformative Approach to Hyperscale Network Modernization

EVERYTHING SURVEY

ACADEMY TRAINING

LEAN-AGILE APPROVALS

360° ROBUST OPERATIONS

DESIGN-LED PLANNING

L E A D

INITIATION CHALLENGES
DESIGN CHALLENGES
DEPLOYMENT CHALLENGES
POOR DATABASES
UNSKILLED MANPOWER
MULTIPLE APPROVALS
MANUAL TRACKING
LOW PRODUCTIVITY

And our survey says

Investment area
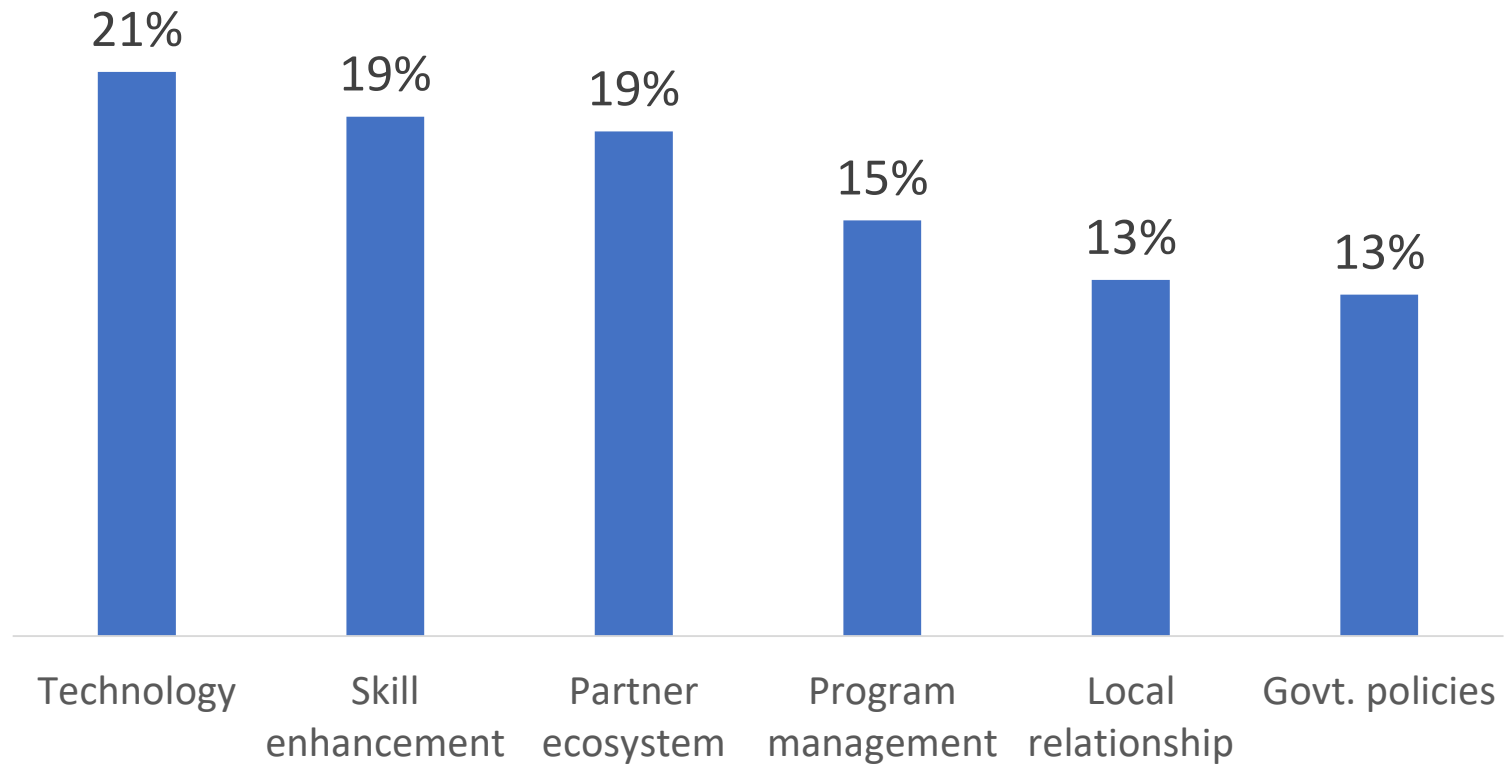
Technology	Skill enhancement	Partner ecosystem	Program management	Local relationship	Govt. policies
21%	19%	19%	15%	13%	13%

Source: primary research from 150+ fibre roll out experts

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- **Why fibre should only be deployed by experts!**

Fibre rollout should be done by experts only

Fibre deployment by experts can add more value to CSPs, while enabling them to focus on their core competency

It will enable capex & opex optimization hence deliver more site efficiency

Capex Optimization	Reduced Opex	Revenue Uplift
Improved design • Efficient routing through a holistic city-wide approach	**Reduced O&M costs** • World class execution leading to less outages	**Faster execution** • Use of state-of-the-art roll out machinery (e.g., German HDD)
Increased Fibre Life-Time • World class execution minimizes the need for Fibre replacement	**More efficient O&M** • Clear inventory combined with word class design allows more efficient repairs	**Lower downtime** • Reduce revenue leakage • Increase customer experience (lower churn)

Hyperscale networks deployment in the most challenging terrains and extreme weather conditions
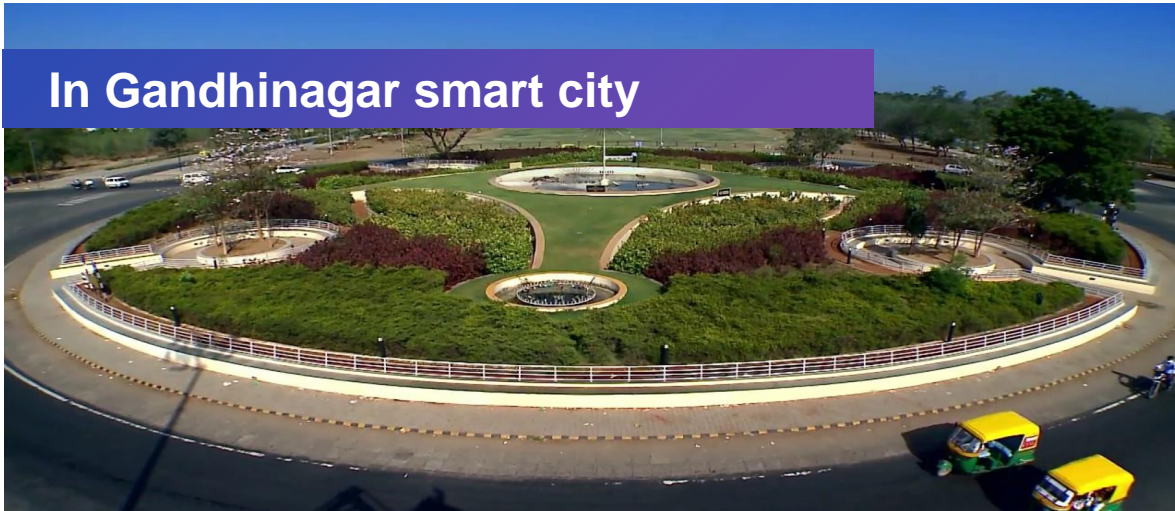
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In the dense Madhya Pradesh forest

In India's defence applications

In Gandhinagar smart city

In Kakinada smart city

Our capabilities across value chain

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Presence in over 100 Countries

Partnering with 8 of top 10 Global Telcos

Optical Fibre

Fibre Roll out

Software

Fibre Cables

System Integration

SOFTWARE TESTIN

3 RESEARCH LABS, 7 PRODUCTION FACILITIES

Sterlite Tech : Designing, Building and Managing Smarter Networks