

STLescope²⁰²⁰

Understanding the science behind Optical Fibre Networks

11th December, 2020

**Let's test our knowledge on
optical fibre networks with a fun quiz!!**

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96 13 052



Jitendra Balakrishnan

CTO- Connectivity Solutions, STL

Dr. Jitendra Balakrishnan is a technology executive with nearly two decades of experience in research & development, manufacturing, business development, and leadership of technology organizations.

Currently, Jitendra is the Chief Technology Officer - Connectivity Solutions at STL. Technology innovation is at the heart of STL's mission to design, build and manage smarter networks. Jitendra is driving an expansion of STL's R&D in telecom products, is developing a long-term vision and roadmap for the technology unit, and is integrating it with other functions within the company. Previously, Jitendra was Research Director - Innovation & Technology - Emerging Markets at Corning Incorporated. In this position, he founded and established Corning's R&D operations in India, which became Corning Research Center India.

Sam Leeman

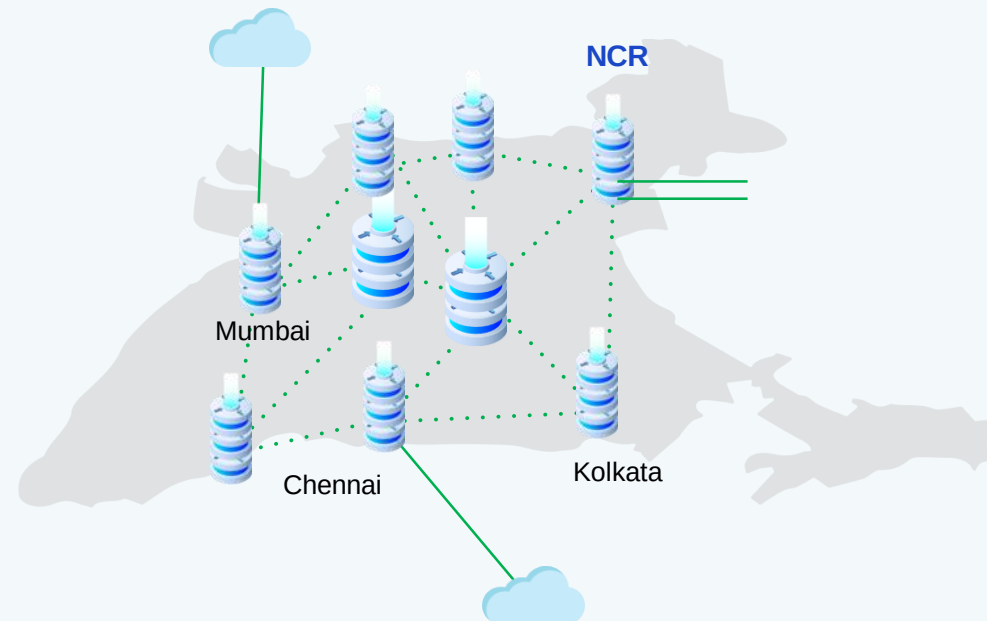
PLM Head - Optical Interconnect, STL

Sam Leeman, a thought leader, an innovator, and an expert in the field of fibre network builds. He joined STL in 2019 the global PLM leader for the Optical Interconnect portfolio driving the product roadmap and aligning it with customer requirements

Sam brings with him over two decades of leadership experience in Product Development, Product Management and Business Development in the telecom industry. He has been actively involved in both emerging as well as established markets and has worked with multiple telecom operators around the world, leading from the front to develop renowned TCO solutions.

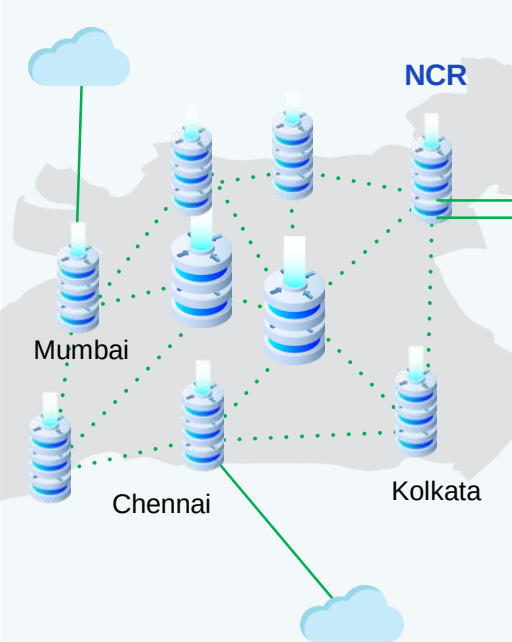
What is a Digital Network?

National CORE

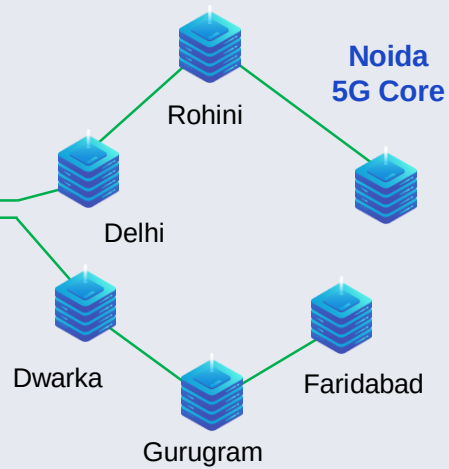


What is a Digital Network?

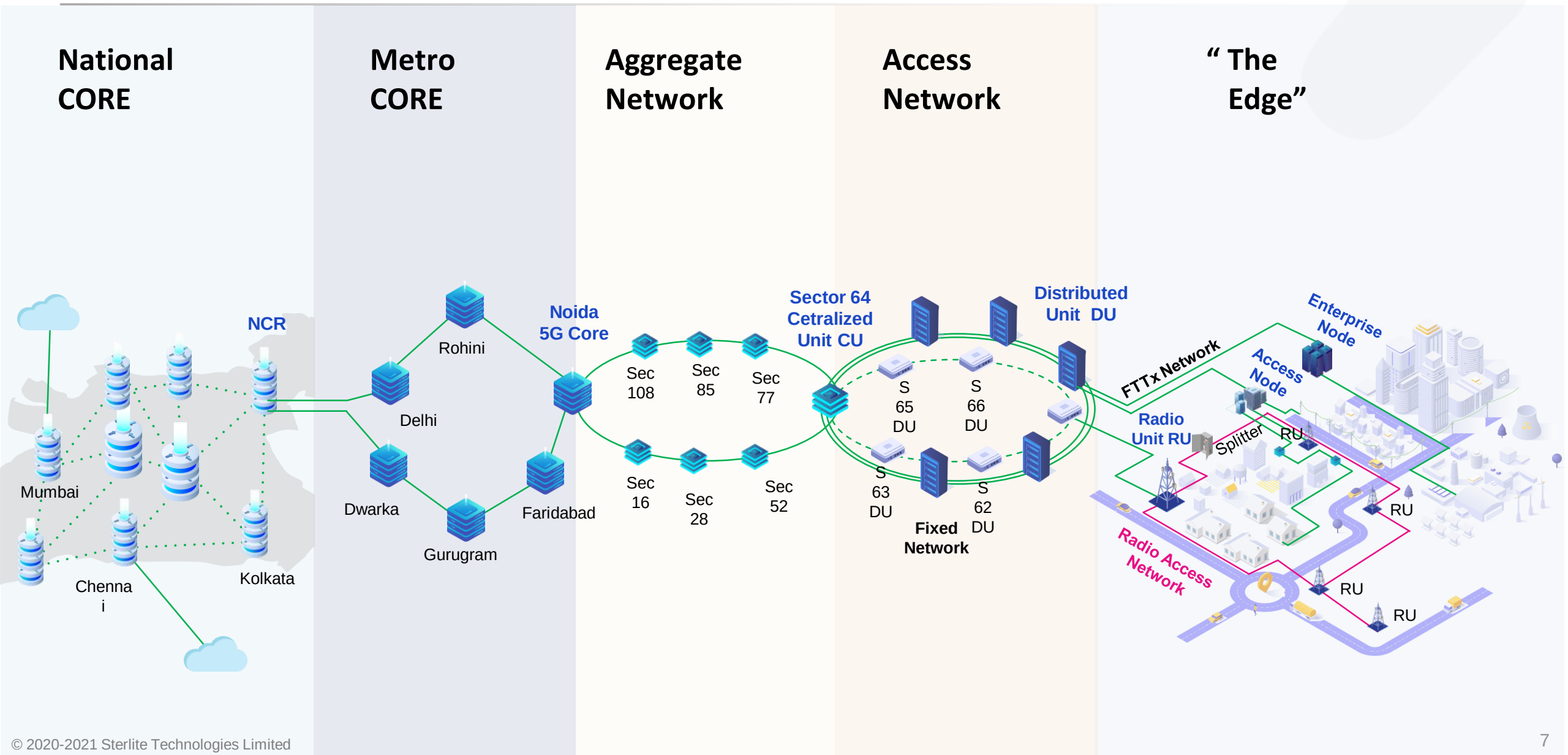
National CORE



Metro CORE



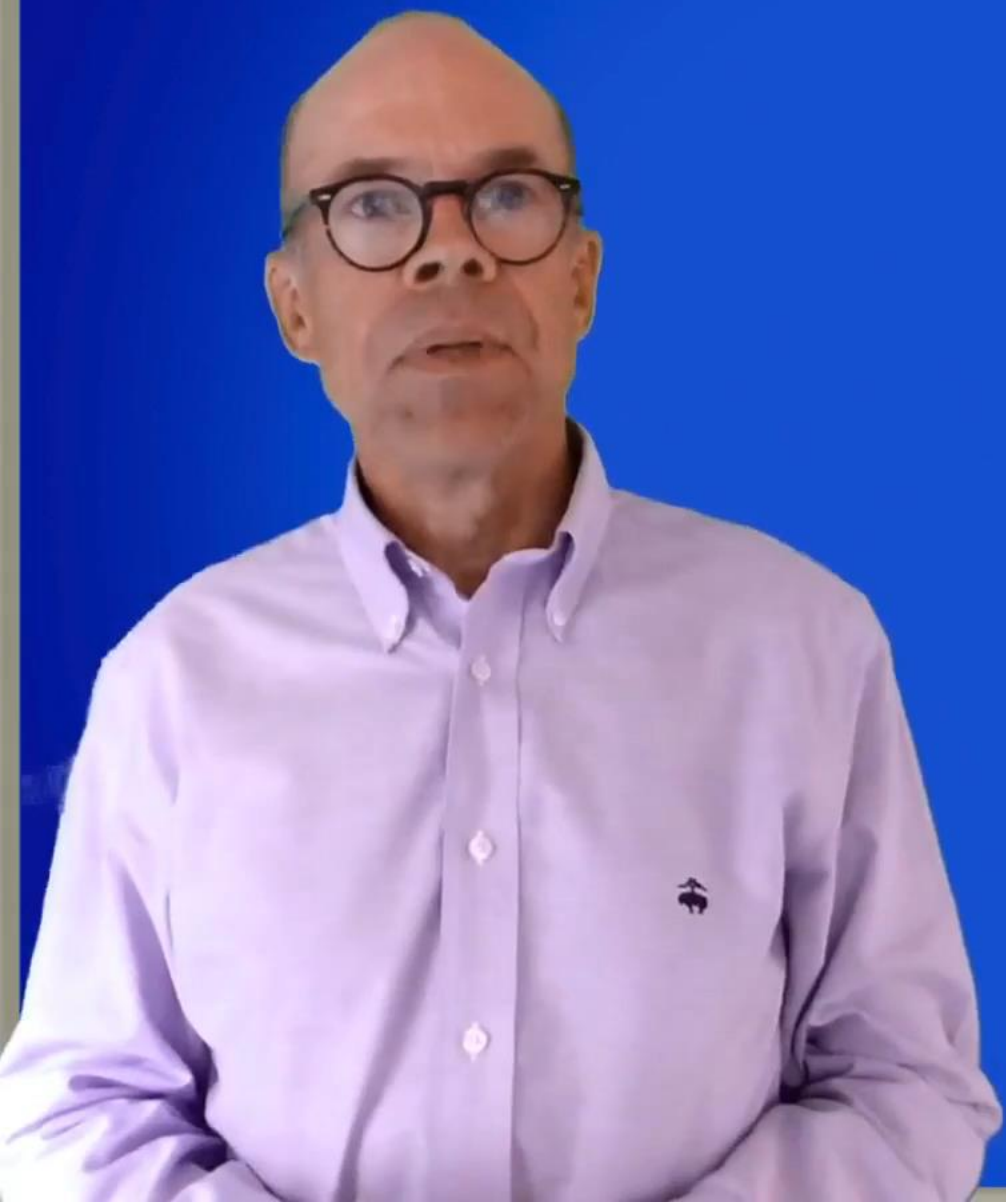
What is a Digital Network?



OPTICAL FIBRE

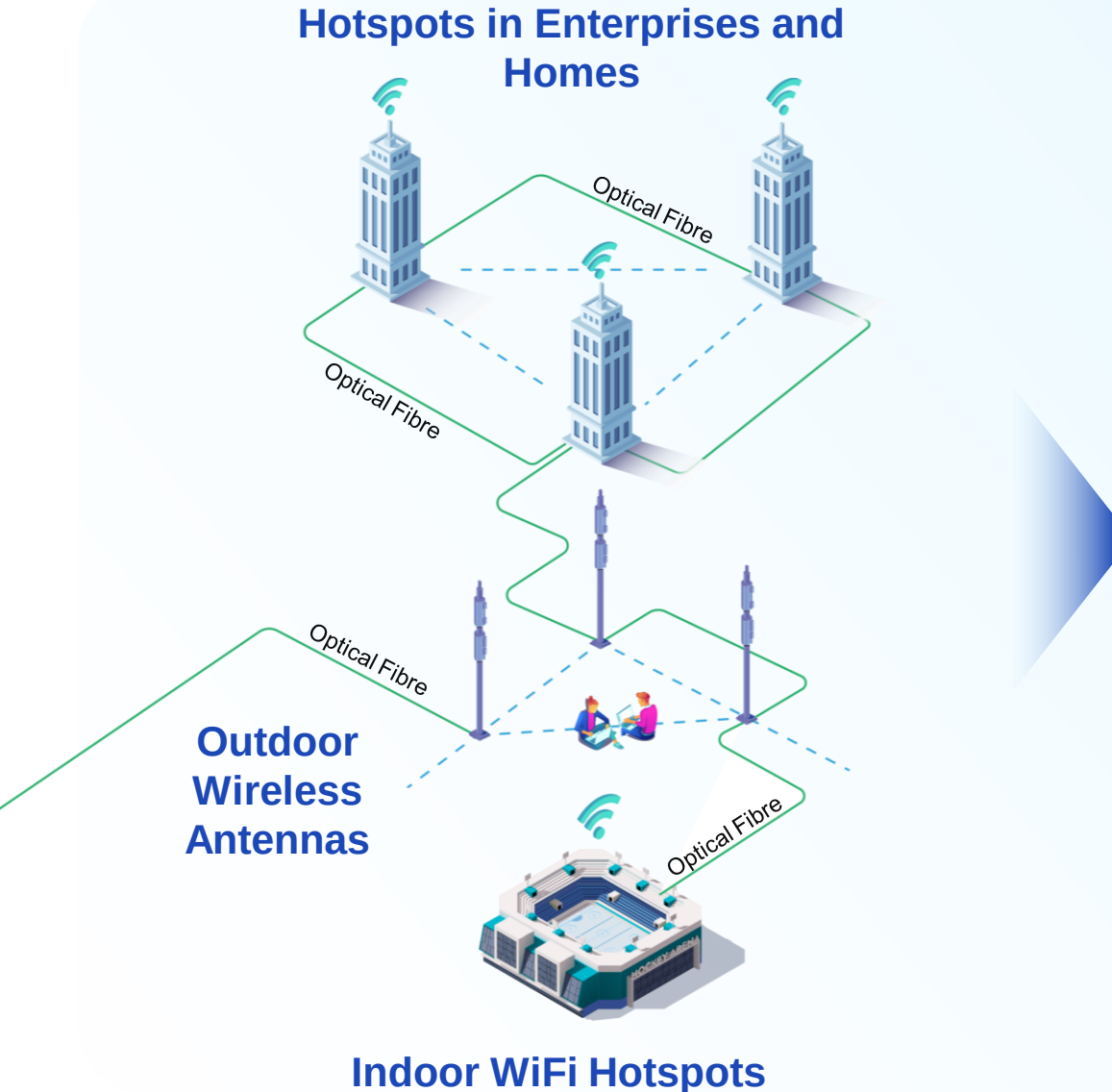
What is it !! How does it work !!

Fibre 101



Fiberization

What is it ?



**Fiberization means
connecting
telecom network
termination points
with
optical fibre cables.**

Fiberization

Why is Optical Fibre Better ?

Primary Method of long distance
Communication in 70s



Coaxial Cable



Microwave



Satellite

Now it is a preferred medium for Long Distance
Communication

Optical Fibre Links

**Fastest
Communication
Speed**

**Infinite
Bandwidth
and Capacity**

**Low
Interference**

**High Tensile
Strength**

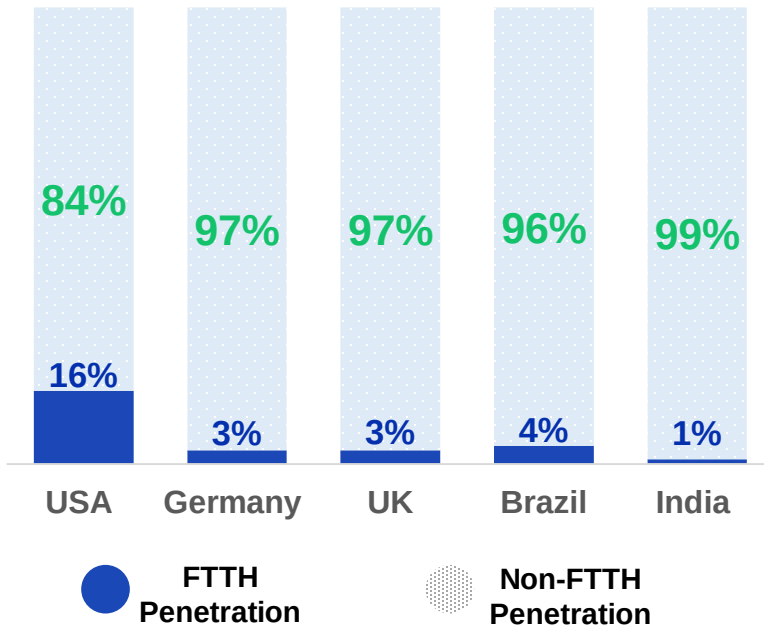
**Secure
Communication**

Fiberization

Why should we care about it ?

By 2025, the number of network end points will surge due to increasing penetration of

Current FTTH Penetration



5G

20%

Global Connections
will be 5G

IoT

21.5 Bn

IoT connected devices

All this will require high speed and low latency network creation which can be possible with **Deep Fiberization and High Densification**

Fiberization

What does Optical Fibre means to 5G

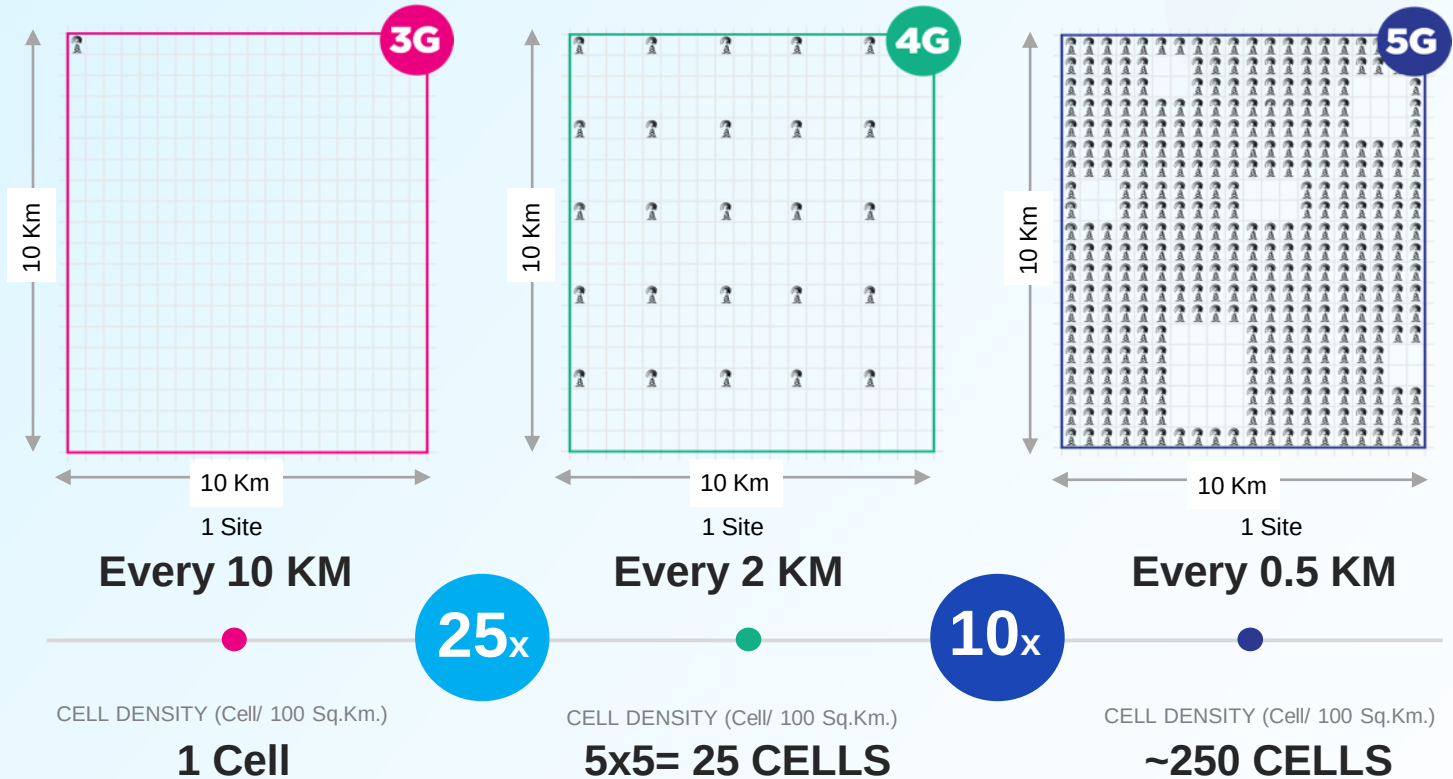
3

Operators per site in
shared microsites

30% - 60%

YoY Growth rate of
urban small cells

Small cell requirements for full 5G commitment



10x

Amount of cell towers to accommodate full 5G services

Demand of Optical Fibre to roll out 5G

Fiberization

What does Optical Fibre means to FTTx



FTTH

70M

Urban Households

~1.5%

Current
FTTH Penetration

~25%

Target FTTH
Penetration by 2024



Bharatnet

World's largest rural broadband project

0.25M

Gram
Panchayats

0.15M

Connected with
Fibre

0.1M

To be
Fiberized



P2P

50M

MSMEs

High Bandwidth Infrastructure Across



Metro Cities



Corporations
and Enterprises



Hospitals



Transportation



Education
Institutes

Fiberization

The Challenges – A, B, C and D



A

Attenuation

Signal Decay



B

Bend Sensitivity

Signal Leakage



C

Compatibility

Legacy and Future Technology

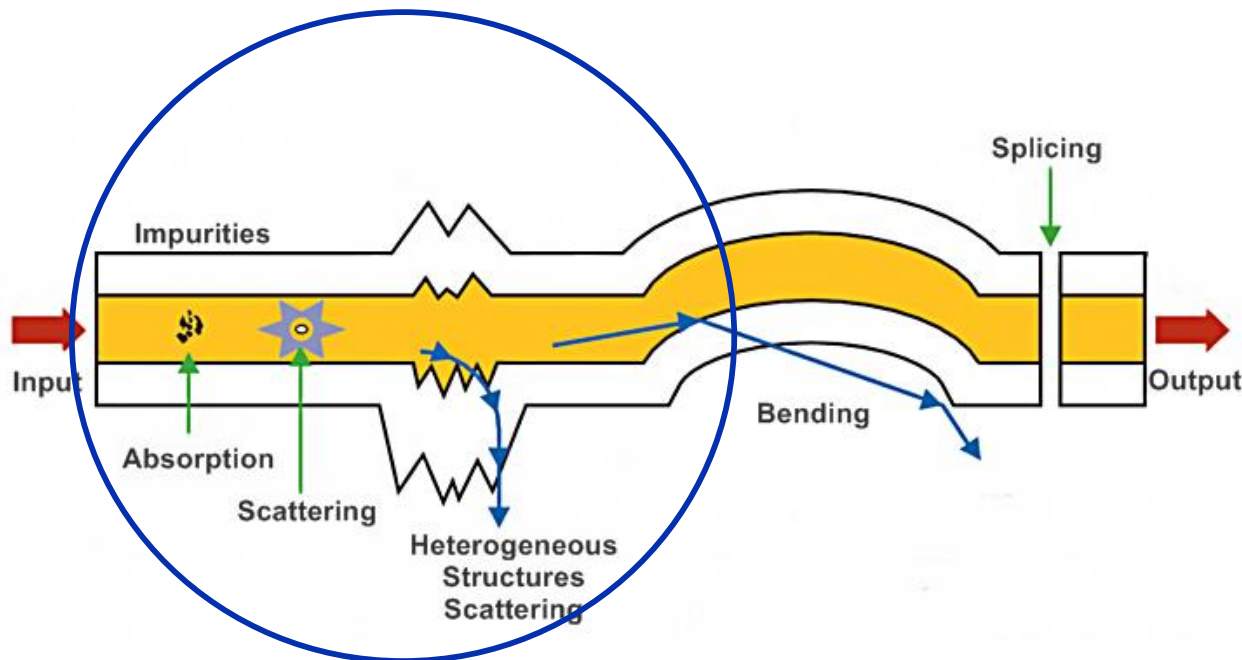


D

Duct Space

Optimize Limited Space

Increasing geographical spread

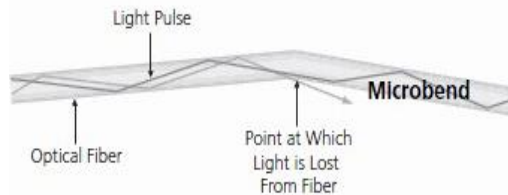


Attenuation refers to signal loss along the length of the fibre.

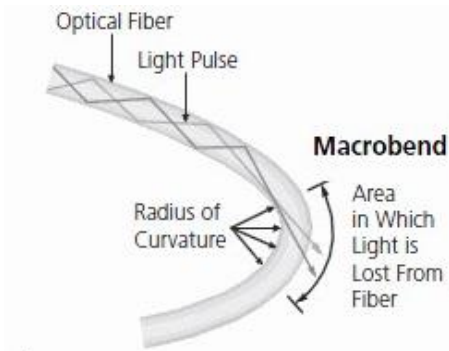
Attenuation happens due to absorption and scattering of light signal inside the core

Bend Insensitive Optical Fibre

Bend Insensitive Fibre provide more than **10x reduced Macro Bend Loss**

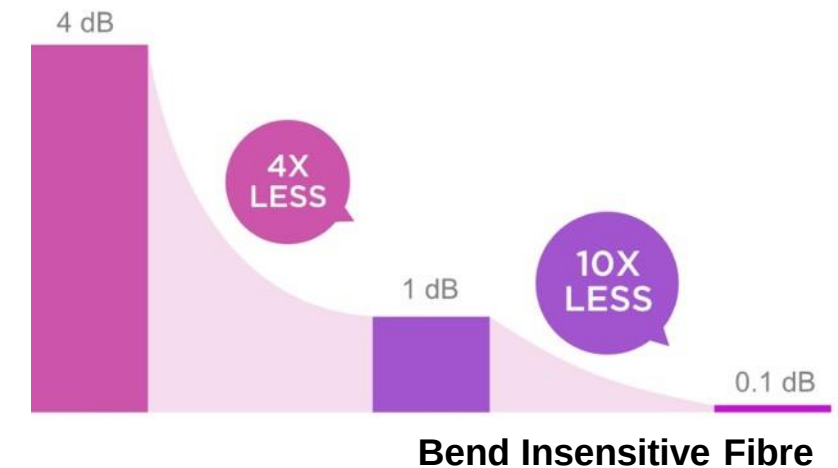


Microbends are axial distortions on core cladding interface caused majorly by the local mechanical stress placed on the cable during manufacturing, packaging or installation



Macrobends, which results in light leakage due to cable bends beyond the specified bend radius during installation

TYPICAL MACROBEND LOSS COMPARISON



Fiberization

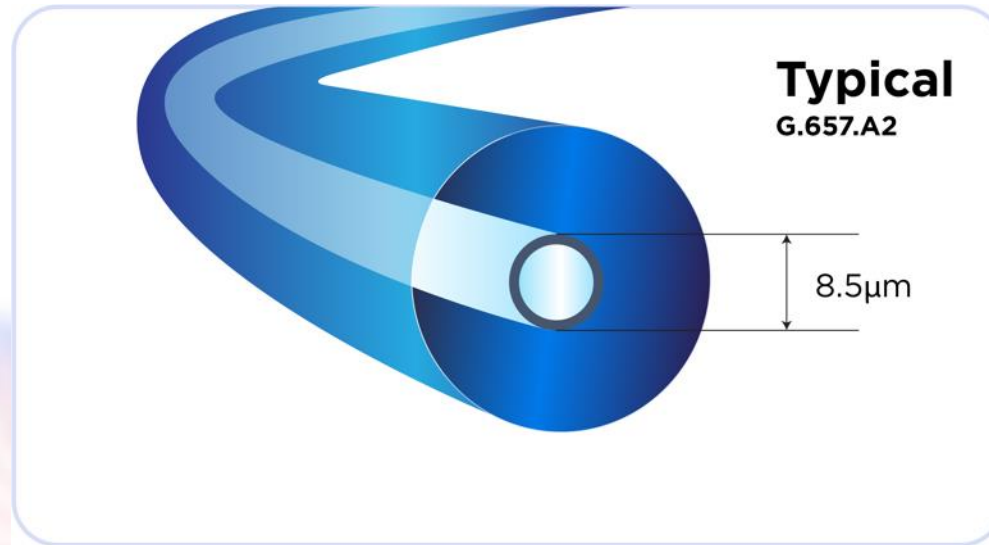
Compatibility with Legacy Network and Future Technology

A- Attenuation

B- Bend Sensitivity

C- Compatibility

D- Duct Space



MFD of Typical G.657. A2: **8.5 micron**



MFD of Legacy G.652. D: **9.1 micron**



MFD Mismatch



**Actual Splice Loss
0.056dB**

A2 to D Apparent Loss **0.12dB**

D to A2 Apparent Loss: **0.24dB**

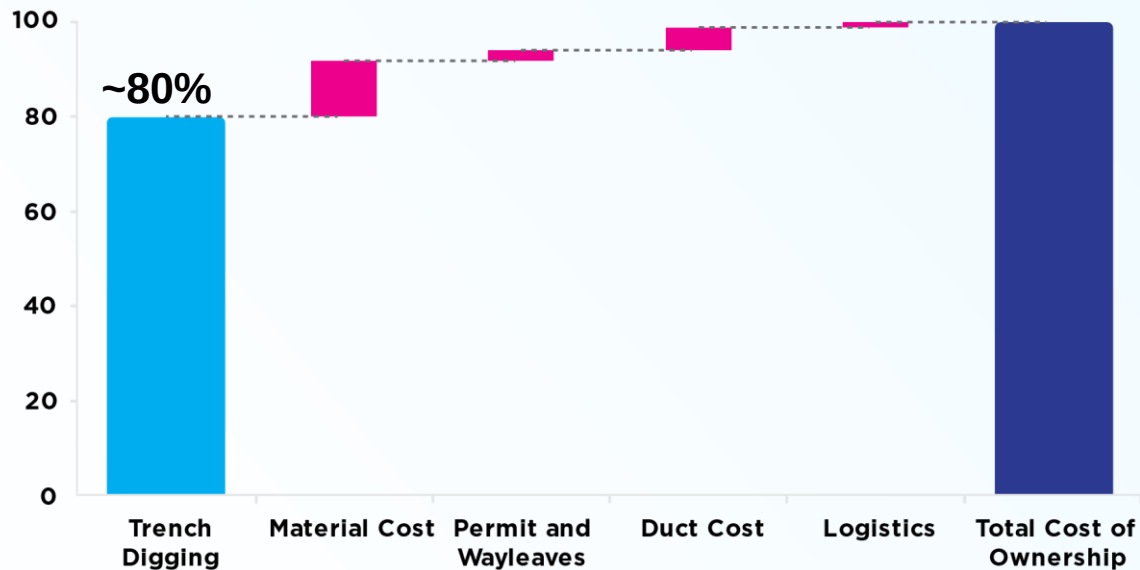


Bottleneck in achieving Higher Bandwidth: Limited Duct Space

80% Cost share of civil work in a Cable Deployment Project

Rest 20% constitutes Cables, Ducts and supplementary products

TCO - Cable Deployment Project



To meet this exponential growth

Need 10X Fibre

In the same available duct space

Minimize the size of Cable as per requirement and provision for future requirement

Maximize Fibre Count on the basis of forecasted future demand

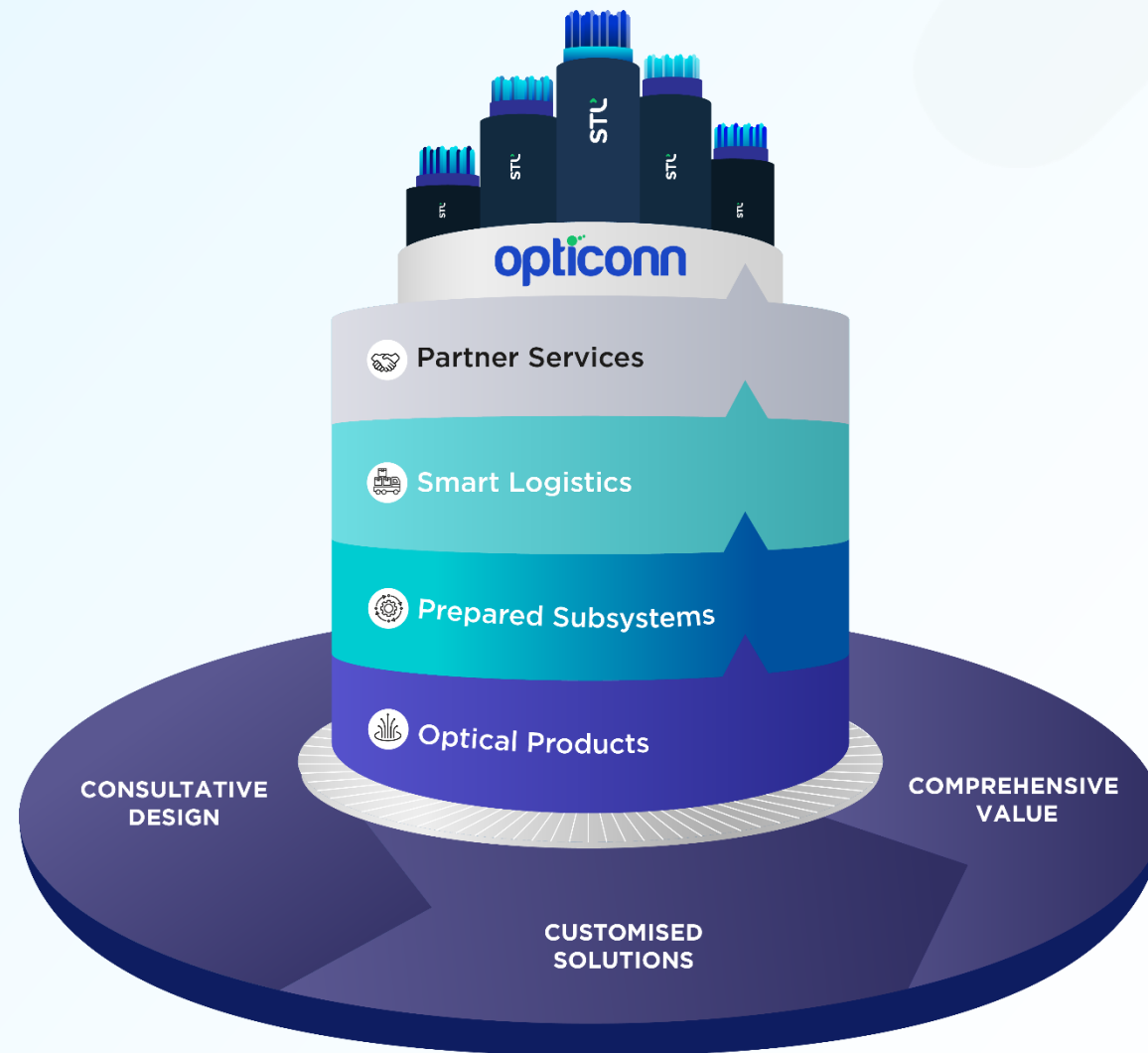
STL Approach

How we make our customers
address these challenges !!



Generating value

by solving an end to end problem for customer, improving overall network experience

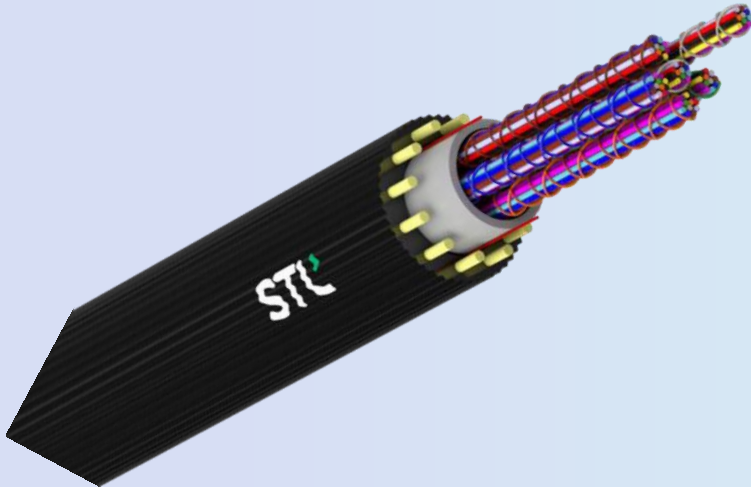


Global innovations for Indian deployment scenarios

Enabling Future Readiness at Lowest Total Cost of Ownership



Backward Compatible
Bend Insensitive Fibre



High Density Ribbon Cable
Intelligently Bonded Ribbon (72F - 6912F)



Underground and Aerial
Optical Interconnect Kits



25% faster deployment
of future proof bend
resilient network

opticonn

Optical Connectivity

Global leader in E2E optical physical layer solutions

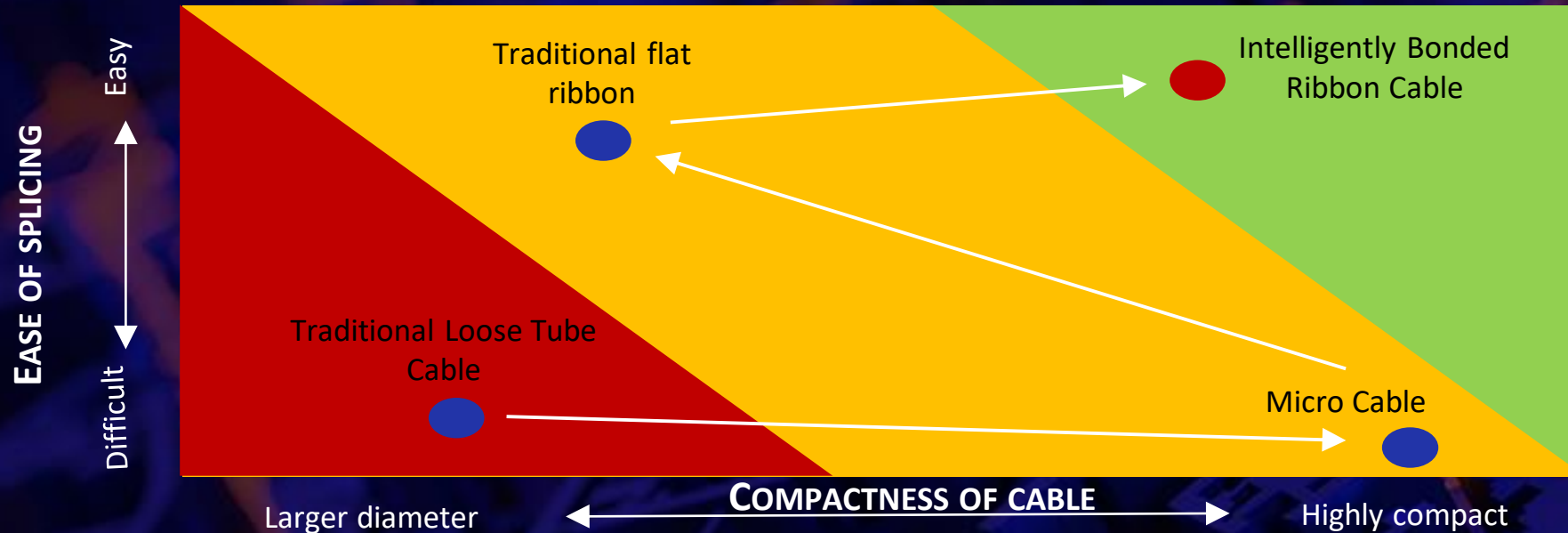


Higher density network -
100% existing duct
capacity augmentation

Next Generation Ribbon Technology

Modern networks require more fiber per cable and Minimize new duct installation and construction

Better TCO from one-time deployment with compact cables in choked ducts



Traditional Loose Tube Cable

Splicing is difficult and time consuming in high fiber count cables

Micro Cable

- Slimmer Jacket & 200um fibre reduces cable diameter
- Splicing is still time consuming

Traditional Flat Ribbon Cable

- Ribbon, bundle of Fibres expedites splicing process
- Unoptimized cable space with flat ribbons in a round cable

Intelligently Bonded Ribbon Cable

- Improved form factor due to bond design
- Collapsible ribbon transforms into flat ribbon for fast splicing



Opticonn Process

STL 25
YEARS OF OPTICAL FIBRE

CONSULTATIVE Design



ENGAGE
Customers



ASSESS
Challenges



CUSTOMISED Solutions



PROPOSE
Solution



BUILD
Products



COMPREHENSIVE Value



VALIDATE
Performance



PARTNER
For Growth



CRS System: Opticonn @ Work

1 Assembling inner CRS to outer CRS shell

Push all the way through the outer shell



2 Connecting to main housing



3 Disconnect from main housing



In Summary

25 Years of Leadership in Optical Fibre Innovation

**Optical Fibre is the right choice
for digital networks**

Fastest Communication Speed

High Bandwidth

Low Interference

**Optical network roll-out is a
complex task**

ABCD of Fiberization

E2E Solutions View

Innovation across the value chain



7 Production Facilities



4 Innovation Labs



425 + Patents



900+ Engineers

Photonics | Chemical, Materials, Process

A large audience of people is seated in rows, facing away from the camera. Many of them have their hands raised high in the air, indicating an interactive session like a Q&A period. The scene is dimly lit with a blue tint. In the background, a large screen displays a logo. The overall atmosphere is one of active participation.

Q&A

