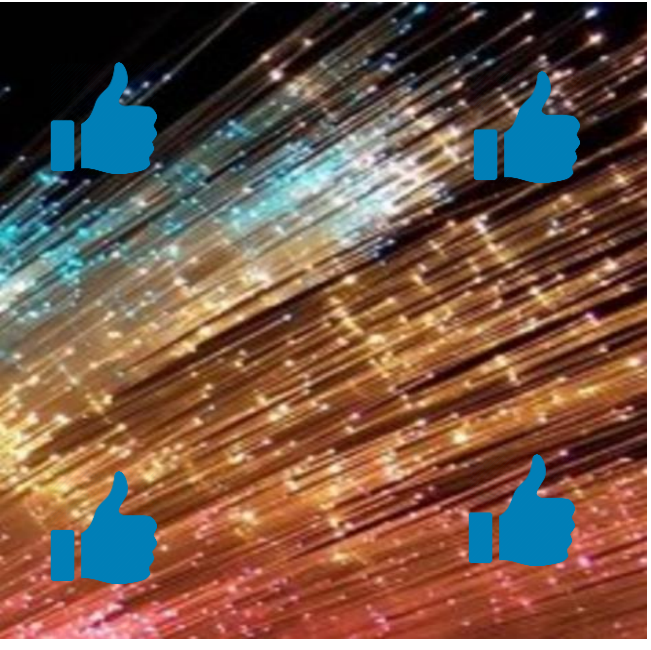
CYIENT

BEST PRACTICES IN COPPER NETWORK REHABILITATION & FTTH INTRODUCTION

What is the superior technology



COPPER

OR

FIBER

?

Copper telephone cables

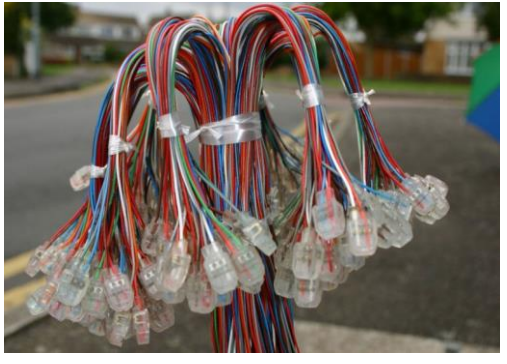
Copper cable infrastructure is more than a century now in most of the countries

Most preferred option for the operators to implement broadband services

Enabled quick and easy upgrade options for the CSPs

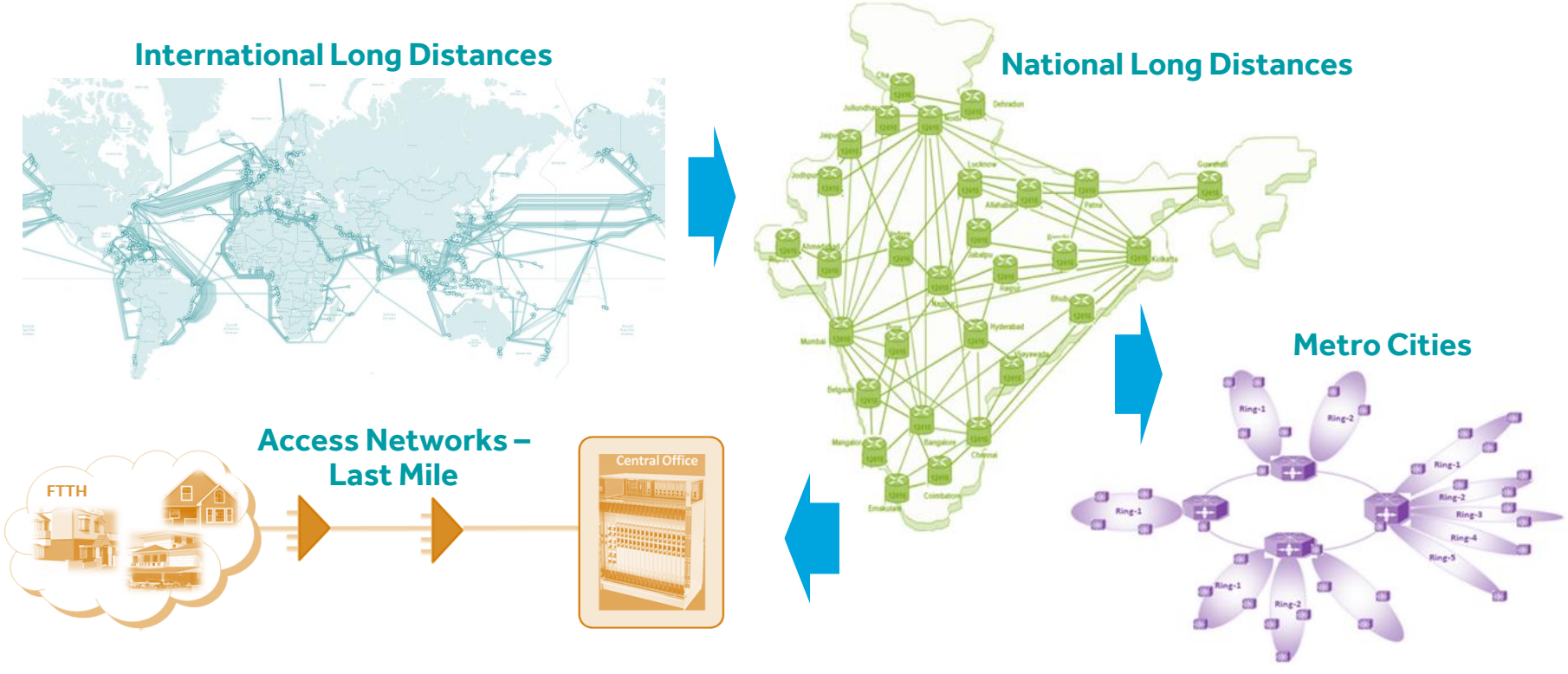
Where is the bulk of telephone cabling?

- 10% is in long distance networks (ILD or NLD)
- 10% is in distribution network
- 80% of all Telco cabling is subscriber loop – Copper



Fiber Cable Evolution

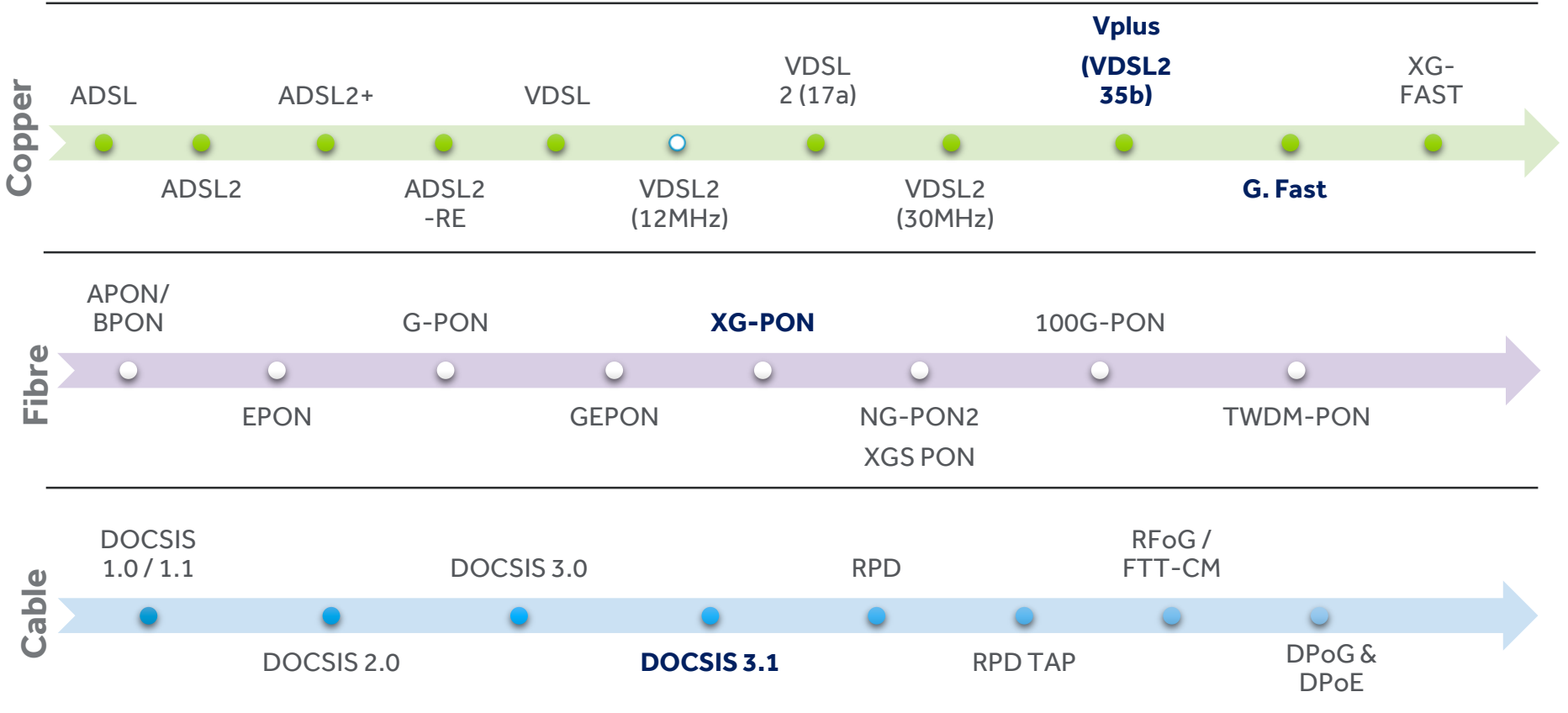
- Copper cables are being replaced by fiber optics over the century, decades and years



- The benefits of fiber optic cables are making an increasingly common choice for CSPs

ACCESS TECHNOLOGIES EVOLUTION

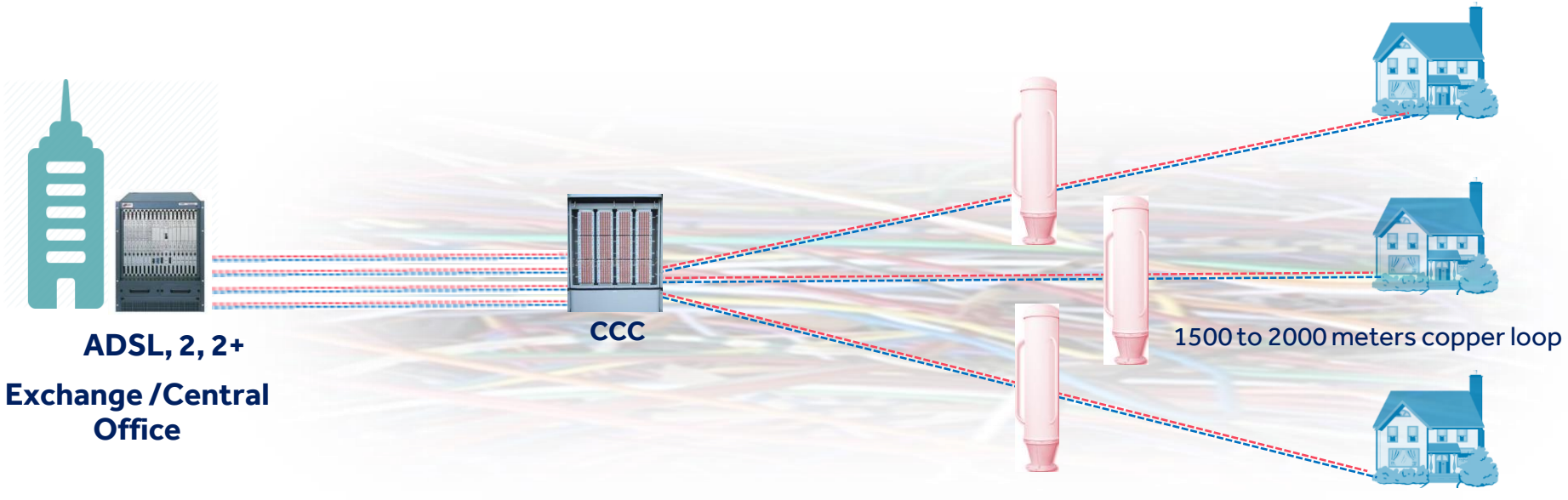
Evolution of 3 Major Fixed Access Technologies



Evolution of 3 Major Fixed Access Technologies

Copper

ADSL — ADSL2 — ADSL2+ — ADSL2 -RE — VDSL — VDSL2 (12MHz) — VDSL 2 (17a) — VDSL2 (30MHz) — **Vplus (VDSL2 35b)** — **G. Fast** — XG-FAST



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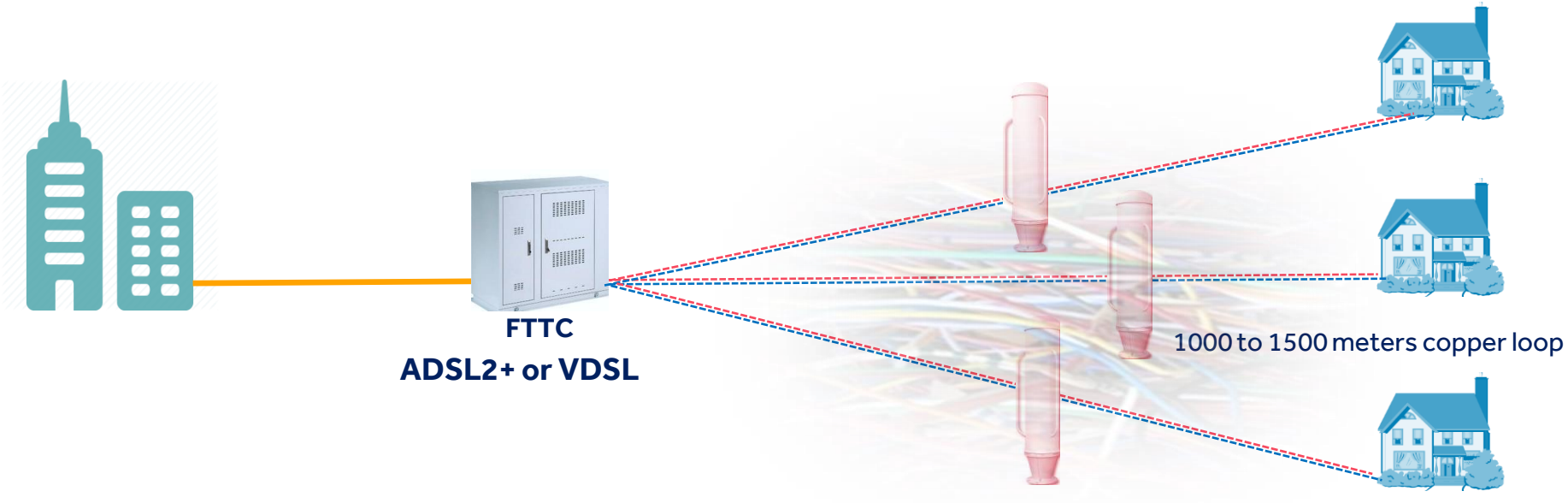

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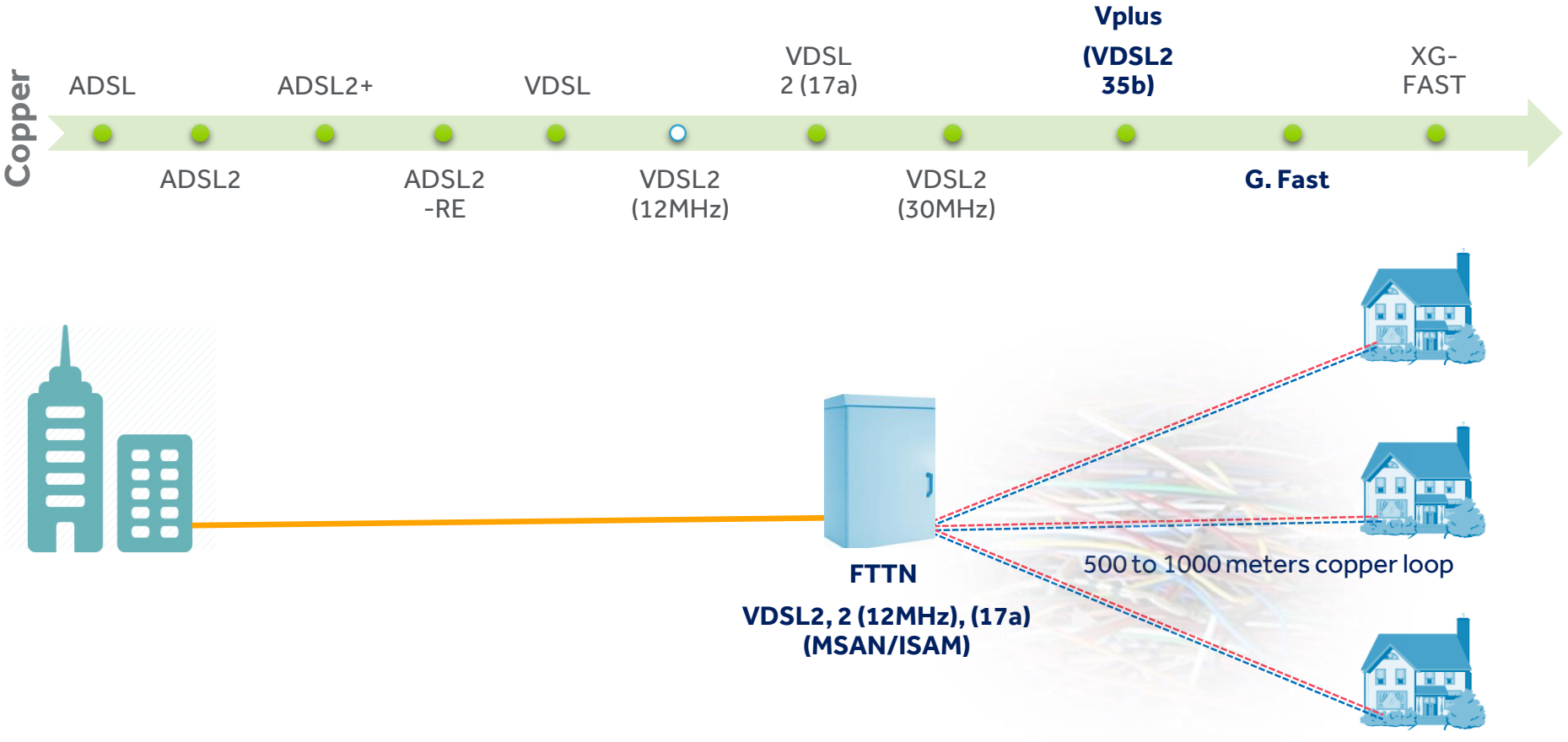
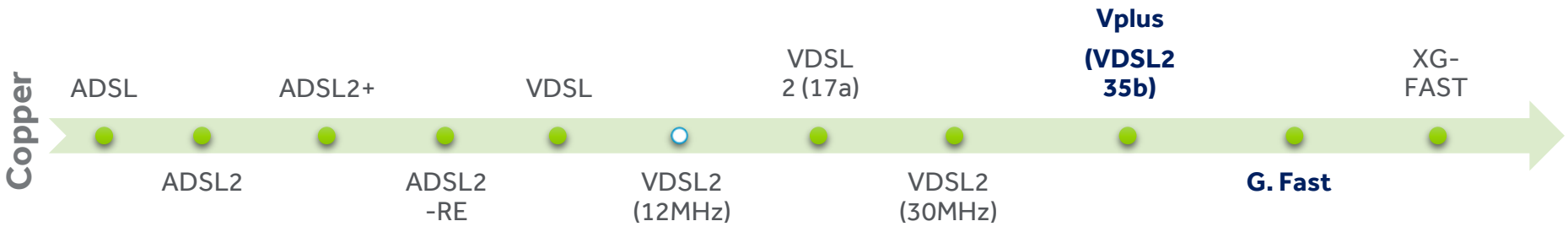
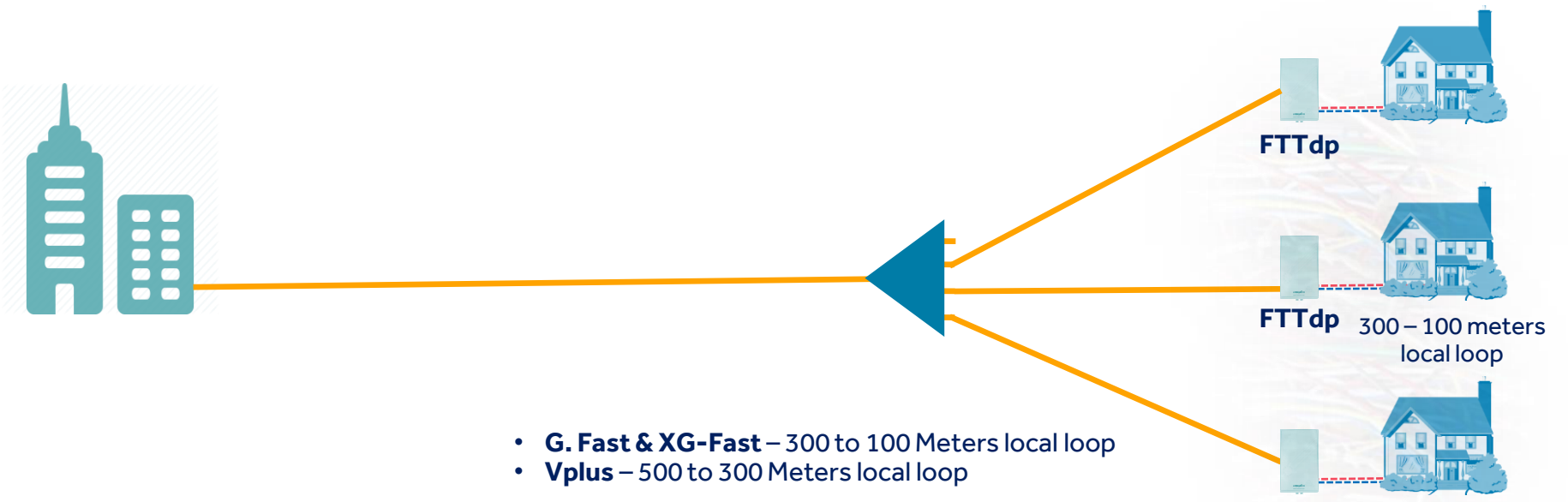


xDSL Technology Expansion over Fibre / FTTx





- **G. Fast & XG-Fast** – 300 to 100 Meters local loop
- **Vplus** – 500 to 300 Meters local loop

Is Fiber Killing Copper..?

WILL FIBER EVER REPLACE COPPER CABLE?

- ✓ Copper cable remains vital in several key applications / in-building networks
- ✓ Copper is reforming to deliver Gigabit services in challenged environments

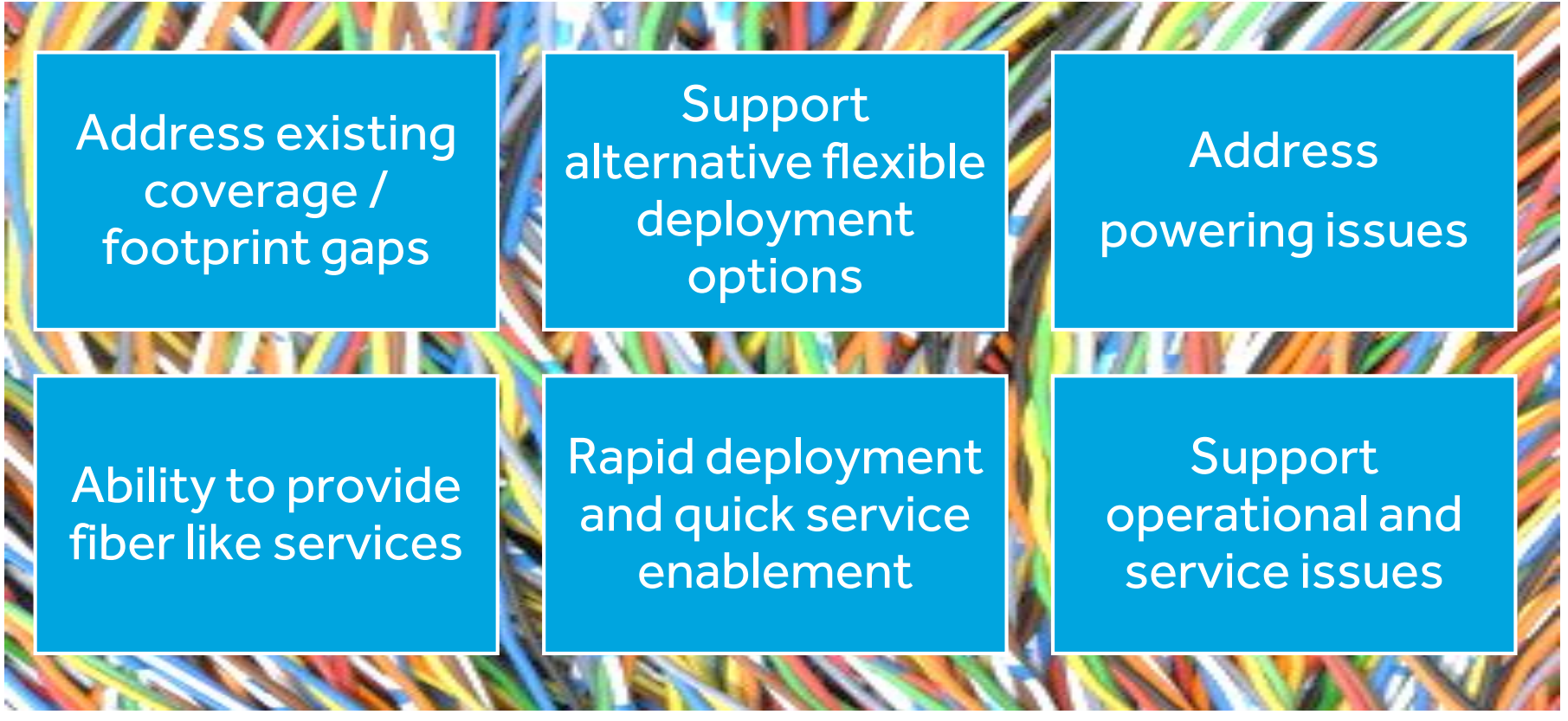
Copper and Fiber will co-exist long-term and will have common development of both

tfl

OPERATOR CASE STUDY

Copper Rehabilitation and FTTH introduction

Need for the Hour – Copper Rehabilitation



Introduction of Telecom Fiji Ltd

Telecom Fiji Limited (TFL) is one of the largest facilities-based providers of fixed line communication and networking services in Fiji

TFL is at the moment under transformation of network technologies from legacy copper access to advanced access technologies.

- ADSL / ADSL2+ to VDSL2 / Vectoring / MSAN / ISAM
- Introduction of FTTH / X

Moving towards upgrading / rehabilitating their existing network infrastructure for better service improvements

- Copper Rehabilitation program, which is under going a lot of improvements currently

Background of Copper Rehabilitation

In 2015, TFL wanted to rehabilitate their copper network to deliver Fiber like services

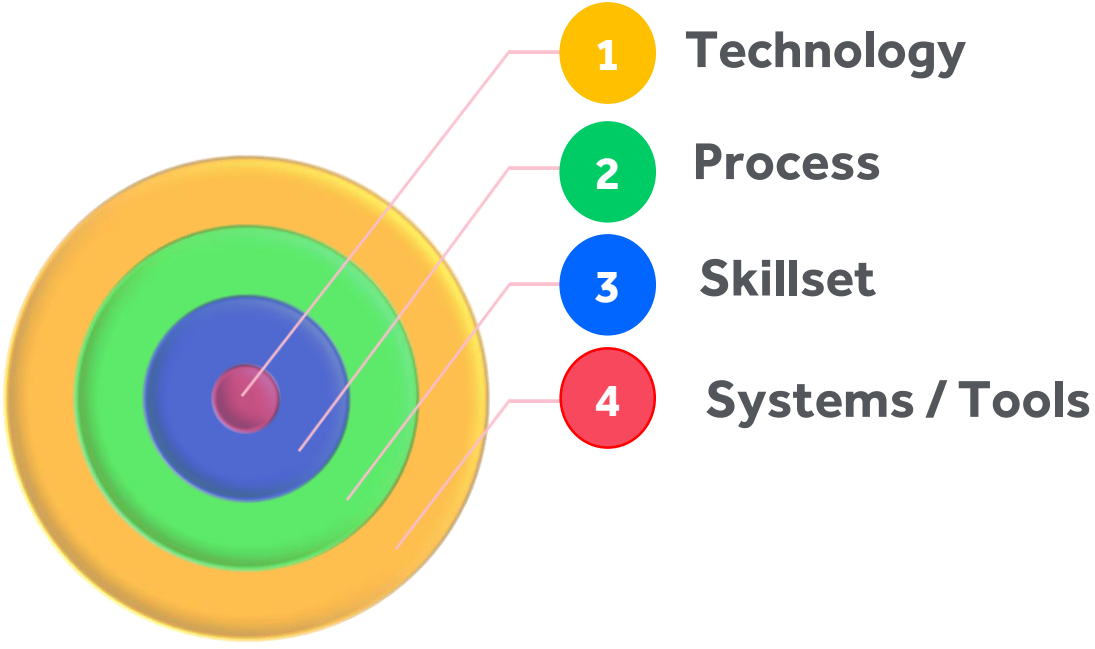
TFL management approached Cyient in assisting the copper rehabilitation program

Cyient deployed its expert consultants onsite to study understand key challenges

Cyient delivered it's value by assisting TFL in their copper network rehabilitation

Key elements of Cyient's Consultancy

There are mainly 4 key areas which are influencing the service quality (QoS) and customer experience (QoE) post cutover and copper rehabilitation



Client Key Challenges

Technology	Process	Skillset	Systems / Tools
• Interoperability • CPE synchronization • Copper health Check • Operational Systems	• Master plan • Communication process • Urgency to deploy the project • Data flow between each systems	• Best practices • Know-how knowledge • Trainings and certifications • Public forum memberships (FTTH & SCTE Councils)	• Field and customer data synchronization • Customer care / TT dispatching / reporting post-cutover / rehabilitation • Multi-vendor EMS / NMS • Copper testing tools

Challenges in introducing FTTH

TFL wanted to introduce FTTX/FTTH while, addressing copper rehabilitation issues

Tactical decisions to carefully plan and decide whether:

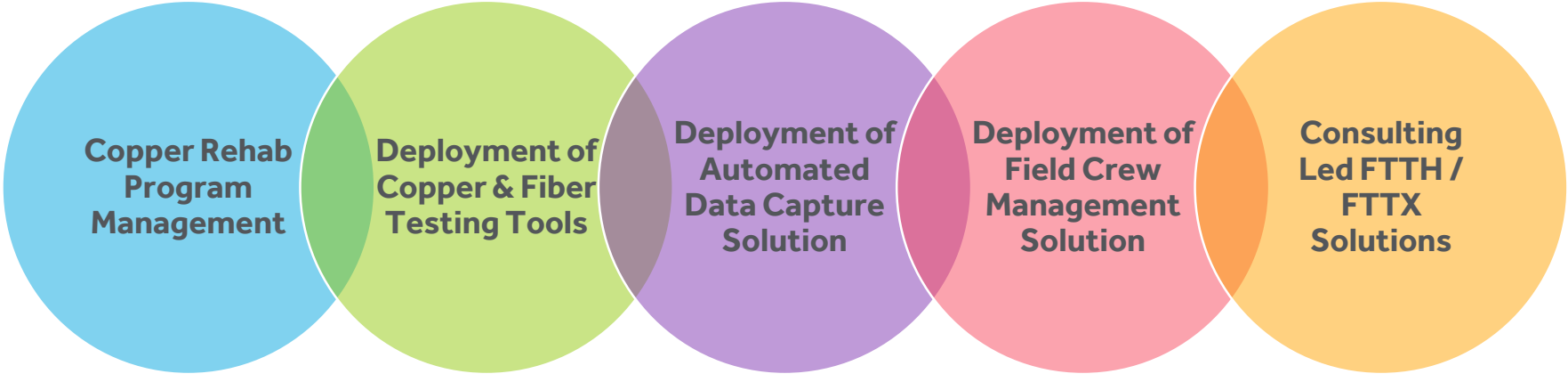
- To proceed for rehabilitation
- Replace copper with Fiber (FTTX)
- Optimize the impacting areas by introducing the Micro-nodes
- Adopt advanced and emerging FTTH technologies

Gaps in the plans on how to move forward to adopt FTTx while, continuing to rehab the copper networks

CYIENT SOLUTIONS

Cyient Solutions

Cyient had successfully deployed their consulting services with the following solutions in order to address the key challenges of Telecom Fiji to resolve the issues (QoS) and enhance their customer experience (QoE)



Copper Rehabilitation Program Management

How to make rehabilitation more efficient and effective

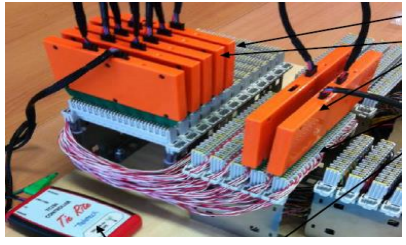
As a priority, a properly qualified, experienced, dedicated, rehabilitation team member is required in each district to:

- Follow up on fault repairs, checking if Joints (underground) Cabinet issues (as seen in Denarau) or Distribution Points require attention for common issues.
- Perform pro-active maintenance within the district on the Cabinets, Cables (dry air supply paper insulated), joints, DP's etc..

- Report problems with Cabinets, Cables, DP's etc.. back through Customer Care Centre for action (presently Cyient sees that there is any other option for Customer Care than to raise a fault).

Solutions – Copper Testing Tools

Adoption of appropriate tools to resolve the copper QoS issues



Solutions – Field Mobile Handheld Devices

Ruggedized Handheld mobile devices help the filed technicians to simplify the field operations by avoiding the major human interfacing issues.

ALGIZ 10X

EXTREME FIELD PERFORMANCE

The powerful ALGIZ 10X rugged tablet helps make your mobile crew more efficient. It can withstand rough weather and harsh environments with features, including a versatile capacitive touchscreen, for impressive field performance.

ALGIZ RT7 ETICKET

BEST-IN-CLASS MOBILE TICKETING

Perfectly ergonomic, seriously rugged, and ready for your mobile transit tasks, the 7-inch ALGIZ RT7 eTicket offers unmatched mobile ticketing performance at an excellent value.

ALGIZ RT7

HEAVYWEIGHT FIELD PERFORMANCE

The ALGIZ RT7 ultra-rugged Android tablet provides powerful field performance in a sleek package for mobile workers who need a high performance device in an outdoor or industrial environment.

ALGIZ 7

SUPER RUGGED, ULTRA-MOBILE

The rugged ALGIZ 7 offers ruggedness and versatile functionality. If you need a larger display than a handheld, or if you need Windows PC functionality, this ALGIZ tablet's 7-inch screen and Windows 7 platform make it a great solution.

Recommendations on FTTx

People Skills:

- Need skilled resources to perform planning, design, field splicing, testing and network maintenance.
  People needs to be trained and certified on various skills including systems (GIS), testing tools, remote monitoring systems.

- FTTH Council certifications / Memberships
- SCTE certifications
- FOA Certifications
- The light brigade certifications

FTTH COUNCIL ASIA PACIFIC | FIBER TO THE HOME APAC

SCTE Society of Cable Telecommunications Engineers

The Fiber Optic Association, Inc. FOA www.foa.org


Certified Fiber to the Home Professional (CFHP)

FTTH COUNCIL

This certifies that

Kiran Kumar Solipuram

has passed the Certified Fiber to the Home Professionals (CFHP) exam and is now an Accredited Member.

On this date October 29, 2012.

This certificate will remain valid until October 31, 2015

Heather Burnett Gold
President
FTTH Council

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LIGHT BRIGADE

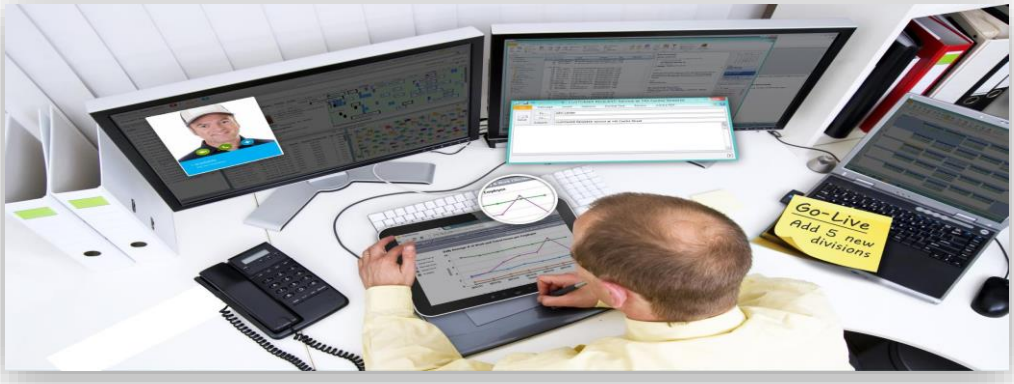
Solutions – Automated Data Capture Tool

iCommsWorld → Targeted PNI Systems

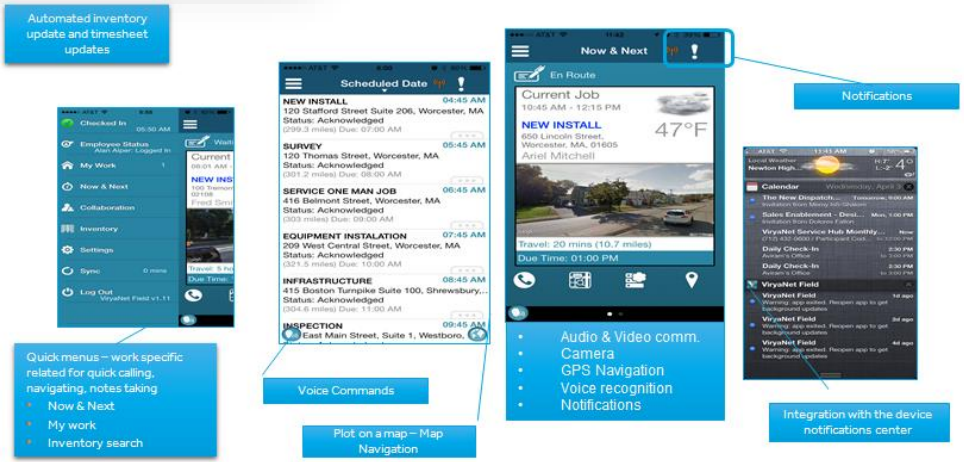
Solutions – Automated Data Capture Tool

iCommsWorld | G/Technology

Solutions – Field Crew Management



Managing field crew's business changes effectively



Consulting-Led FTTH Solution

FTTx needs to be planned as a future-proof architecture by considering the other business segments:

- Rolling the FTTx to cover other business segments of Mobile Towers (FTTm), Antennas (FTTa), Wi-Fi Access Points (AP), Public HD advertisement, Utility Meters (FTTu), Traffic / Highway surveillance etc..

FTTx deployment needs to be planned to facilitate interoperability for growing future traffic needs, network amendments and upgrades.

Compatibility issues may arise or entire system may needs alteration if Interoperability not planned.

ONE NATIONAL PLAN TO STAND OUT OF THE COMPETETION

How we delivered

DESIGNING TOMORROW TOGETHER

Three simple words that describe our **unique approach** of working with our clients to improve **our client's business** and lives of their clients.

Conclusion

COPPER AND FIBER WILL CO-EXIST LONG-TERM AND WILL HAVE COMMON DEVELOPMENT OF BOTH

Cyient helps Operators in evaluating the access networks for optimization (copper / cable) and introducing the next-generation high-speed broadband (FTTH/FTTX) networks while, supports in maintaining the network proactively with advanced analytics solutions

CYIENT

THANK YOU

Kiran Solipuram

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Cyient Australia Pty Ltd