CYIENT | Nothing Less

CyCuRec

Green Transition

Harnessing RPA for Copper Reclamation



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Abstract

Copper reclamation, a practice involving the removal of unused copper cable networks for recycling, is gaining prominence. This could be in an underground, aerial, or buried environment. Copper removal is a cost-saving measure, eliminating unused cables and reducing the need for their maintenance. Additionally, organizations can generate revenue by selling the scrap copper obtained through this process. The high salvage value of copper assets enhances the appeal of copper network removal efforts.

This document explores the challenges and opportunities related to the reclamation of existing and aging copper cables of telecommunications companies (telcos). It provides insights into the regulatory environment, technological advancements, cost considerations, and outlines a strategic roadmap for telcos in North America (NAM) navigating this crucial phase in network evolution.

Uncover the power of our Cyient's methodology, driving a 40% ROI and unlocking substantial cost savings of $1 million for every 350000 feet of reclaimed copper cable. Embark on the journey to efficient maintenance cost reduction with our groundbreaking whitepaper.

Introduction

In response to technological advancements and the escalating demand for higher bandwidth, numerous telecommunications companies (telcos) have executed comprehensive upgrades, adopting advanced technologies like fiber optics. This strategic shift has led to transformative changes in the telecommunications landscape. As the industry adopts fiber optics, the retirement of legacy copper networks emerges as a critical initiative. The surge in interest surrounding copper reclamation projects aligns with the widespread implementation of fiber services, cable network upgrades, and the availability of fixed wireless solutions. These modern networks have resulted in a decrease in legacy copper customers, affecting the consumption of copper networks and raising maintenance costs for the remaining customer base.

Copper reclamation is poised to play a pivotal role in enabling the next phase of telecom development. Organizations that effectively navigate this process stand to benefit from reduced operational costs, access to new growth capital, and the provision of more lucrative services.



Copper is giving way to fiber

The US has a network of roughly 3 to 4.5 million miles of copper-centric telecommunications cables running in its soil and water, most of which are underutilized, being old or obsolete. These cables are inefficient, costly to maintain, and pose environmental and safety risks.

Eliminating these underutilized copper cables will benefit the environment and can translate into a direct cash benefit for CSPs, reclamation companies, and other service providers.

According to a 2023 report from Kearney, a single 9,000-foot, 2400 pair count F1 cable can yield $100,000–$150,000 in net salvage value after planning, network engineering, and extraction costs. Basis this, the value of the copper reclamation industry related to telecom cables in the US is approximately pegged between $1.5 to $3 billion.

In today's digital era, connectivity is the heartbeat of our daily lives, enabling always- on networks and interconnected societies through rapidly evolving communications infrastructure. Historically, copper has been hailed as the backbone of connectivity, because of its enduring legacy of reliability, durability, and cost-effectiveness. However, copper is now at the crossroads of decommissioning and reclamation. Copper is giving way to fiber! The surge in interest around copper decommissioning aligns with the ascendancy of fiber services, upgraded cable DOCSIS networks, and the emergence of fixed wireless technologies. These innovations, heralding a decline in legacy copper customers, coincide with the imperative to curtail operational costs and capitalize on the high salvage value of copper assets.

Telecommunications companies benefit significantly from easily accessible, planned copper data for removal, especially when the salvage value of the copper is high. This enables telcos to promptly execute GTM plans for the physical removal of copper networks and their sale for recycling or salvaging at high value. However, if the copper data is not readily available when the salvage value is high, it poses a potential loss for telcos.



Below are key drivers for considering copper cable removal in networks

- Unused circuits/ abandoned cables
- Bandwidth/ performance limitations
- Legal directive
- Updated road/ transport networks
- Technological obsolescence
- High OPEX
- Existence of physically damaged network
- While FTTx – deployments

The imperative to retire traditional copper networks springs from more than just financial considerations. It also comes from a crucial need to terminate outdated, energy-intensive technologies that have become operationally inefficient. While retiring the existing copper-centric telecommunications cables is a global phenomenon, copper decommissioning in North America has been significant in the last decade (2013-2023) and is expected to increase in the coming decade (2024-2034).



United states of america

In the US, the total number of fixed broadband subscribers increased from 96 million in 2013 to 132 million in 2023 at a CAGR of 3.25% signifying an increasing demand for high-speed and reliable Internet connectivity. In the last decade (2013-2023), fiber-optic (FTTx) broadband subscriptions have seen remarkable growth from 7.7 million in 2013 to 29.5 million in 2023 at a CAGR of 14.32% highlighting the strategic importance of fiber-optic networks in meeting the escalating demands of the digital era. In contrast, xDSL broadband subscriptions, utilizing copper infrastructure, saw a decline from 30.8 million in 2013 to 12.6 million in 2023 at a CAGR of -8.55% underscoring the industry's move away from copper- based infrastructure in favor of more advanced and efficient technologies. In the next decade (2024-2034), the FTTx broadband subscriptions are further expected to increase at a CAGR of 10%, while the xDSL broadband subscriptions are expected to decline at a CAGR of 9.86%.

Canada

Similar to the US, between 2013 and 2023, Canada also experienced a surge in fixed broadband subscribers, escalating from 12 million to 16 million at a consistent CAGR of 3.33%, indicative of the growing demand for reliable high-speed Internet. Over the past decade (2013-2023), FTTx broadband subscriptions showed remarkable growth, soaring from 0.6 million to 5.34 million at an impressive CAGR of 23.88%, underscoring the vital role of fiber optic networks in meeting digital era demands. Conversely, xDSL broadband subscriptions, reliant on aging copper infrastructure, witnessed a conspicuous decline from 4.5 million in 2013 to 2 million in 2023, signaling a strategic industry shift away from outdated copper-based systems. Looking forward (2024-2034), FTTx broadband subscriptions are anticipated to sustain growth at a projected CAGR of 2%, while xDSL broadband subscriptions are expected to decline further with a CAGR of 5.46%. These evolving trends highlight a dynamic landscape as the nation embraces advanced connectivity, bidding farewell to copper-based networks.



Challenges of copper reclamation

Telcos face numerous challenges in the reclamation of existing copper infrastructure. While the copper reclamation program is important for technological advancement, it entails several difficulties in ensuring a smooth transition.

The key challenges telcos face are:

01



Limited team/ capacity of copper expertise team

02



Incompatible legacy data systems

03



Service disruptions and downtime

04



Regulatory compliance

Cyient's end-to-end copper reclamation services

Recognizing the challenges in implementing copper reclamation programs, Cyient offers cost-effective solutions specifically customized to meet each customer's unique requirements. Our CyCuRec solution provides comprehensive support spanning the entire life cycle management of copper networks, encompassing planning, design, support for construction, as well as ongoing management and optimization.

Our end-to-end copper reclamation network engineering services include the following:

- Assessment and analysis
- Consolidation of copper network
- Support for cost analysis
- Design
- Support - construction team
- As-built updates
- Develop & deploy progress tracking system

i) Assessment/analysis

The purpose here is to thoroughly study the existing copper network data that resides in various legacy systems, and identify the copper cables that do not have working circuits, that provide a return on investment by removal/extraction.

The main criteria are:

- Copper cable network length of ~>5000 ft and size ~>900 pairs are the potential recommended standards that yield potential salvage value when compared to the removal costs.
- Digital record verification
- Field visits/survey to review and confirm
- Confirmation of the unused circuits through the helpdesk/ticketing system where necessary to ensure identified cables don't have live circuits

ii) Consolidation of copper network (semi-automated using AI/RPA)

In certain instances, opportunities exist to enhance network efficiency through strategic planning of copper pairs or cables and their allocation to distribution points. This involves effectively transferring pairs, leading to the identification of unused or inactive copper cables that can be considered for removal.

Given the extensive records of copper pair connectivity, the task of planning and executing the transfer of copper pairs to another cable is both laborious and time-consuming. To address this challenge, we implemented semi-automated tools including AI & RPA. These tools helped streamline the process, accelerating it with minimal manual intervention and ensuring precise results. The semi-automated tools can analyze vast amounts of data, identify optimal transfer strategies, and execute them efficiently.

iii) Support for cost analysis

Provide necessary support for analyzing the cost incurred and the ROI that can be generated by selling the copper through customer-specific tools or defined processes. In alignment with the telco's need, we develop and deploy "Copper Salvage Calculators "to streamline calculations accurately, ensuring optimal outcomes

iv) Copper reclamation design

Our reclamation designs are in line with the requirements and comply with the Telco's specific requirements and local regulatory guidelines.

Key steps involved in this process:

- Create work packages with the cables identified and approved for copper reclamation from the assessment and analysis
- Create design and required permit plans for the work package in the customer-specific network inventory system
- Design review and approval

v) Support for construction team

We provide the necessary support to the construction teams for the extraction of the identified/approved copper cables for removal. We prepare the following:

Key steps involved in this process:

- Construction packages as per regulatory guidelines
- Traffic control plans (TCP) where necessary

v) As-built updates

Maintaining accurate records of the network infrastructure through as-built updates is crucial for future maintenance and expansion programs. After physically removing the copper cables from the field, it is essential to update the inventory based on field records. These updates are necessary to maintain the integrity of the inventory system and ensure alignment with the construction notes.

Therefore, we provide as-built updates services as well, which encompass any changes made during the copper cable removal process. Following the successful extraction of the copper network, updates are made in the customer-specific inventory system.

v) Development & deployment of bespoke program management tools

A well-designed web application for any project process and tracking serves as a central hub for managing projects, optimizing workflows, and driving collaboration across teams. Its multifaceted capabilities empower organizations to deliver projects more effectively, mitigate risks, and achieve strategic objectives.

We know how important a project tracking tool is to collaborate and process tracking, for effective utilization of resources, reporting, and dashboard metrics of the progress. Therefore, apart from planning and designing copper reclamation programs, we also provide a Web application or tool for progress tracking. Deploying a web application for process and project tracking can greatly enhance organizational efficiency and productivity.



Key aspects of CyCuRec and its potential uses

SLA-based workflow for approvals from cost analysis and planners

Job allocation and tracking

Sync with reclamation available tracking tools

Dashboard

Generate detailed report to fielder

Smooth execution of tasks, such as assessment, design, and so on

Copper removal progress

Dynamic charts to track the progress of copper removal initiatives over time

Comparative analysis of removal efforts across different regions or network segments and the benefits w.r.t. the salvage value

Document management

Communication and collaboration

Business benefits and best practices

Key benefits of removing copper cables from network:



Monetizing salvaged materials / financial return and investment recovery



Enhanced network performance



Operational cost savings



Environmental sustainability



Boosts sustainability goals



Improved quality of customer service



Cleared pathways for fiber



Simplified network, updated records

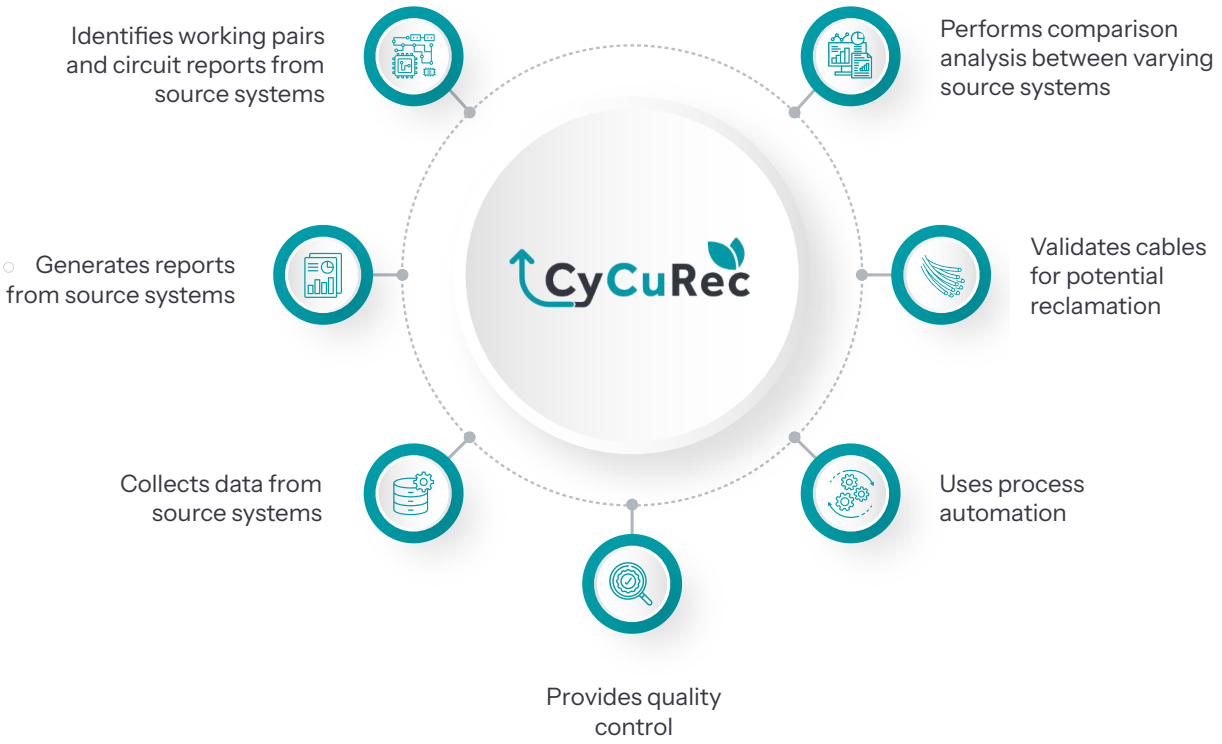


Compliance with industry standards

Best practices

Cyient has developed AI-based technology Accelerators to improve the process and quality of the copper reclamation and removal process. Emerging technologies, such as RPA (robotic process automation), cognitive computing, and IoT can profoundly impact and transform enterprise business processes and systems to improve efficiencies of people, processes, and customer experience by reducing CAPEX and minimizing delivery times.

Cyient's RPA team plays a crucial role in implementing the right tools and process that result in efficiency gains, accuracy, and adherence to SLAs /compliance of copper reclamation solutions.



Working with major CSPs and EPCs (engineering, procurement, and construction) across the globe, our engineers have gained extensive experience in planning and designing activities of copper/ fiber / HFC networks ranging from building permits, site visits, and network planning, to detailed design, as-built/DBoRs/redline updates on technologies such as smallworld, spatialnet, microstation, QGIS, G/Tech, network engineer, 3GIS, autoCAD and more.

Success stories

Cyient's extensive expertise spans over three decades, marked by a legacy of innovation and commitment to empowering global communication service providers (CSPs) and engineering, procurement, and construction (EPC) firms. While our journey began with pioneering GIS systems and large-scale data transformation programs, we continuously evolve to address emerging challenges and opportunities in the telecommunications landscape.

One such recent endeavor involves our foray into copper reclamation a burgeoning field aimed at sustainable resource management and environmental stewardship.

Leveraging our decades-long experience and deep industry insights, we collaborated with a leading telecom operator in USA to devise and implement efficient strategies for reclaiming copper resources from decommissioned networks. This venture exemplifies our agility and adaptability in embracing novel solutions and underscores our commitment to driving positive change within the telecommunications sector.

Here are few flag ship case studies that we delivered across the globe covering the entire network life cycle:

Empowering Tier 1 US Telco's copper reclamation, enhancing value extraction from decommissioned cables

Cyient researched **290M**+ feet and engineered **170M+** feet of copper for reclamation, unlocking **$780M** in gross revenue recovery while reducing maintenance costs and accelerating fiber deployment.

The service offering included the scope, research and design. Created required permits and traffic control plans (TCP) enabling the removal process thereby clearing the pathways for fiber.

Efficient copper decommissioning resulting in space and energy savings with innovation

Cyient's innovative approach in central office consolidation, facilitates a seamless migration from asymmetric digital subscriber line (ADSL) to broadband, resulting in substantial space savings and **3 Mwatts** (26,300 MWh) in power consumption per annum.

Successful decommissioning activities were carried out for approximately 3000 roadside devices and 2000 PSTN connections.

Conclusion

The telco's role in copper reclamation is critical in evolving sustainability and resource productivity. Leveraging the skillful resources for research and analyzing techniques with extensive knowledge in copper networks and utilizing AI/automation, cost effective design techniques will help CSPs to plan their strategic goals in the effective removal of copper.

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Srinivas boasts 25 years of extensive experience spanning operations, business development, partner management, pre-sales, and practice marketing. His expertise includes technical pre-sales consulting for telcos, particularly in copper engineering and fiber engineering, focusing on FTTx technologies. Srinivas has played a pivotal role in co-authoring frameworks related to data migration and data conflation & smart FTTx plan and design areas. As the head of pre-sales for North America in the communications business unit, he is tasked with identifying, defining, and launching new service offerings align with Cyient's customers' strategic ambitions to solve problems that matter.

About Cyient

Cyient is a global lifecycle engineering company powering mission-critical industries from design to aftermarket across products, plants, and networks. With 300+ customers and 15,000+ associates across 30+ countries, we combine human expertise, deep domain knowledge, and AI to deliver intelligent engineering solutions across Aerospace and Rail, Automotive and Mobility, Connectivity, Energy, Healthcare, Mining, Utilities, and beyond.

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