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Algorithmic Fiber Network Planning for Cost-Efficient Infrastructure Deployment

CASE STUDY: ML Based Fiber Optics Line Planning

At A Glance

Development and delivery of two automation-focused planning case studies for Germany, focused on optimizing fiber network cost planning and nationwide RF data reformatting.

Locations:

Japan, Tokyo / Germany(Remote)

Sector:

Telecommunications / RF & Fiber Planning / Data Engineering

Services Provided:

Multi-layer and multi-vendor fiber cost calculation algorithm, Automated RF planning data restructuring, Nationwide cell parameter adaptation for evolving project requirements, Data processing pipeline design and implementation

PROJECT OVERVIEW

Project Background & Challenges

A telecom software global vendor required scalable, algorithm-driven solutions to manage the complexity of multi-vendor, multi-layer fiber deployments and RF planning transformations. Legacy data formats, rapidly changing operational needs, and cost-sensitive deployment models created a demand for precise automation and repeatable analytics.

Our Solution / Approach

An algorithmic model was built to calculate optimal fiber deployment paths using distance, vendor specifications, and location-based cost parameters. This provided engineering teams with cost-optimized fiber planning recommendations across different network layers and vendor systems.

SbySoft team tackled the challenge of unifying complex, multi-vendor data and accurately modeling fiber costs across diverse geographies. The resulting solution reduced manual effort by over 70% and enabled high-precision, cost-optimized fiber planning aligned with Vendor's evolving operations.

Key steps Included

- Development of a distance- and cost-based scoring algorithm for fiber routing
- Vendor profile abstraction for algorithmic comparison
- Parsing and transformation of RF cell parameter files using automated scripts
- Validation checks for data integrity during restructuring
- Delivery of configuration-ready output files for direct system use

TECHNICAL OVERVIEW

Technical Highlights

- Designed and deployed Python-based analytical tools for fiber cost modeling
- Supported multiple vendor data templates and formats
- Achieved scalable automation through modular architecture
- Delivered nationwide database transformation in alignment with new planning strategies

Specialist Skills & Team Approach

The project was executed by a cross-functional team with expertise in data science, RF planning, and telecom software engineering. Custom scripts, internal tools, and structured automation flows ensured high precision, minimal human intervention, and complete documentation for knowledge transfer.

Project was delivered with minimal manpower thanks to the strategic use of AI-assisted processes and automated workflows. Most targets were met ahead of schedule due to effective planning, smart resource allocation, and close collaboration with contracted partners.

The resulting models were delivered with three highly detailed and clear reports: Executive summary reports were clear, concise, and focused on key results.

A detailed report for the technical team, split into two parts: one with visual materials for presentation, and the other containing statistical test results and data analysis.

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CHALLENGES & RESULTS

CHALLENGES

Complexity of unifying heterogeneous data from multiple vendors

Modeling accurate costs across varied geographies and infrastructure layers

Maintaining planning accuracy while accelerating transformation speed

RESULTS

Delivered high-impact, reusable solutions adaptable to future planning cycles

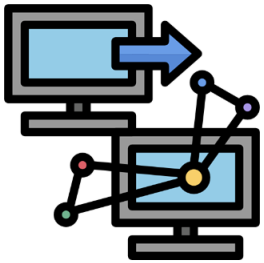
Reduced manual planning effort by over 70%Enabled cost-driven fiber path decisions with high geographic accuracy

Delivered structured, compliant data outputs aligned with current operational model

IDEAL SCENARIOS

Multi-Vendor Fiber Network Planning

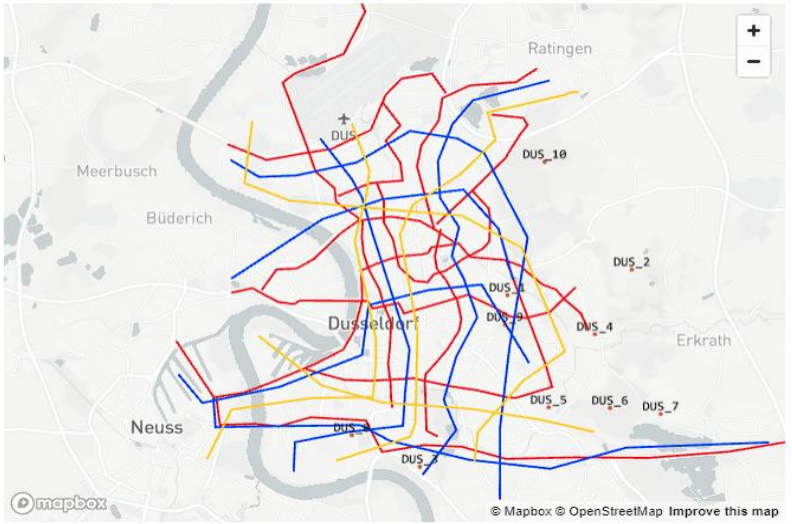
Nationwide Network Parameter Restructuring



Cost-Aware Greenfield Rollouts

Planning Data Standardization Across Systems

REPORT DATA



	Point	Min_Distance	Site Name	Min_Distance_Own	Min_Distance_V1	Min_
0	51.23278787 6.828896869	287.121	DUS_1	307.0427	287.121	
1	51.23949687 6.877493537	1,615.5493	DUS_2	1,615.5493	2,952.3421	
2	51.18787059 6.794628688	199.3762	DUS_3	597.7035	199.3762	

Figure 1: Fiber Optic Path Evaluation Module. This module of the planning tool evaluates and compares fiber optic line distances for each site. It automatically identifies the most suitable alternatives based on cost, distance, and feasibility analyses.

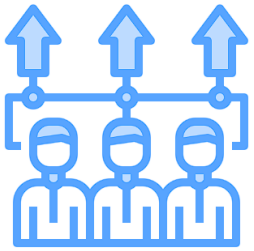
TESTIMONIALS

"The automation framework and algorithmic planning solutions delivered by SbySoft significantly transformed our RF planning workflows. Their ability to merge multi-vendor complexity with actionable cost-based decisions saved us weeks of manual effort and unlocked new levels of operational agility across our German deployment."

Global Key Account Director, Infovista Japan

WHY SBYSOFT ?

Access to highly specialized consultants with hands-on delivery experience.

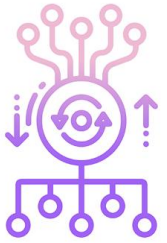


The ability to scale up teams quickly for regional or multi-country projects.

A practical, data led approach grounded in real-world network behaviors.

Fast, fully remote delivery with deep expertise and consistency

Smart, cost-effective RF solutions tailored to each project’s goals.



A data-driven approach that reduces costs, shortens timelines, and improves accuracy.

CONTACT

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Specializing in Cloud-Based RAN Technologies, Microservices, ML/AI Automation, and Cross-Disciplinary Solutions

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