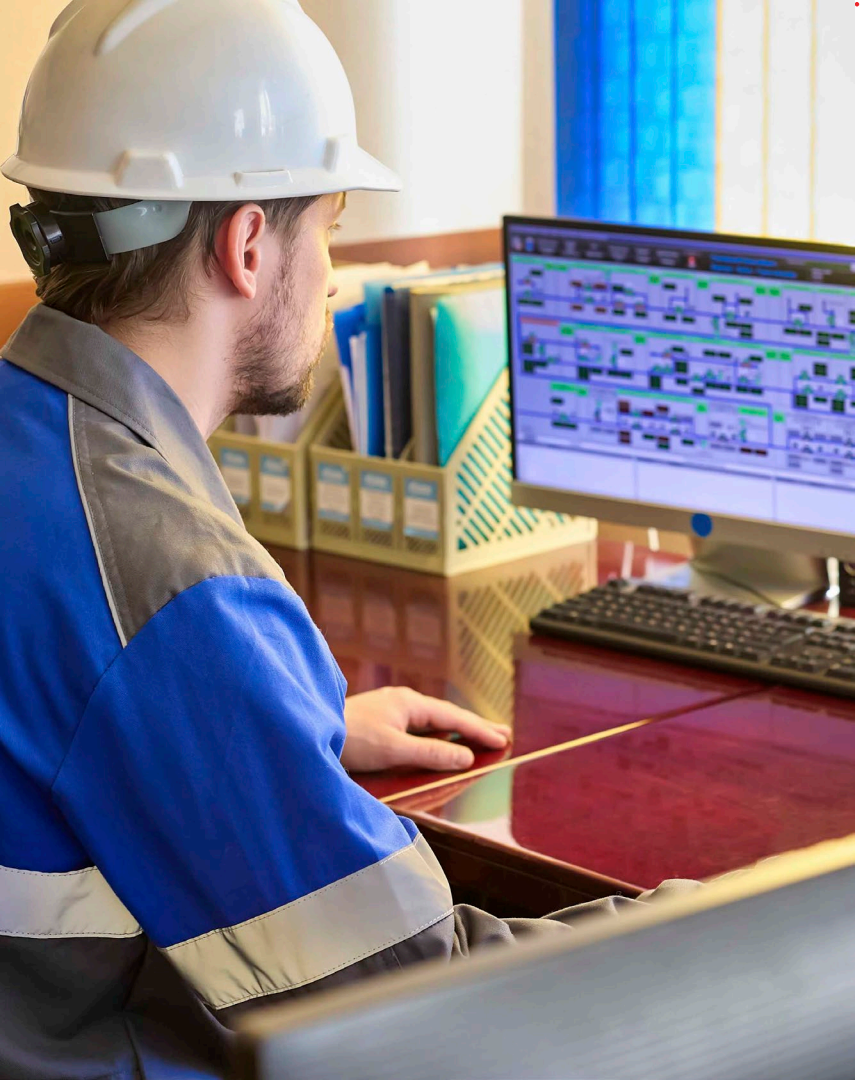


Design digitization for faster fibre deployment

Authors:

Sabharinath S | Rajesh Khanna Jalandhar | Deesha Chaware

Prodapt

Fibre planning and design is becoming a greater necessity every day with increased competition and market demand

> The global Fiber-to-the-Home/Building (FTTH/B) market is projected to reach **US$29.7 B** by 2026, growing at a CAGR of **13.1%.** -Research & Market

Plan and design challenges faced by fibre operators

Skill shortage
Hinders the rapid rollout of fibre

Manual work
Takes longer duration due to multiple hand-offs and paperwork in High-level Design (HLD), and Low-level Design (LLD)

Unstandardized designs
Leads to quality/consistency issues in templates and documents

Unstructured work culture
Generates incorrect/missed field inputs and raises health & safety concerns

Impact of challenges

Budget exhaustion: Reworks and errors consume potential margins

Missed deadlines: Delayed rollouts and revenue realization

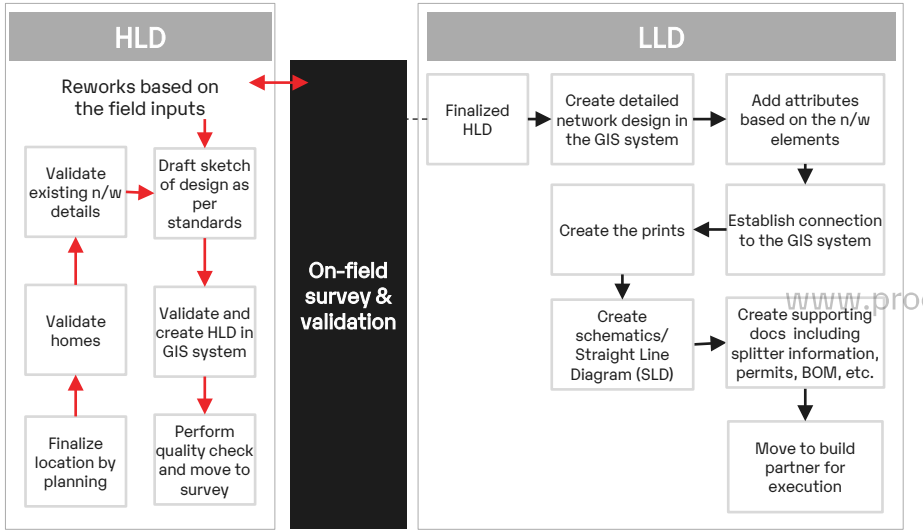
Loss of competitive edge: Inability to cope with market dynamics

The network needs to be accurately planned and designed, with costs calculated and analyzed for every street/house to achieve faster fibre rollouts.

Accelerate fibre design processes with automation

Reduce manual tasks, reworks, and errors

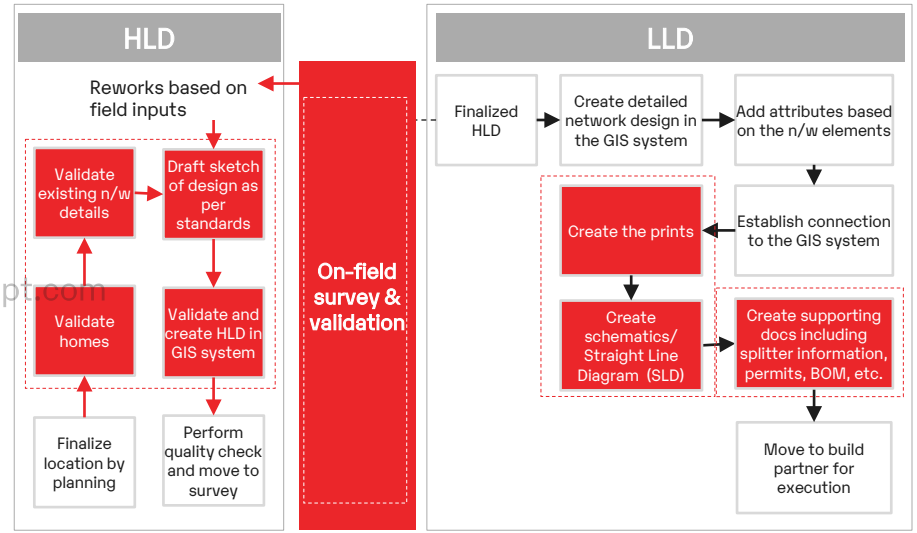
Manual fibre design process (~45 to 60 days)



The current design process is manual, error-prone, and goes through reworks based on the on-field survey inadequacy and missing details resulting in rollout delays.

- Poor transparency
- Rework and repeat follow-ups
- Manual processes
- Time consuming

Automated fibre design process (~25 days)

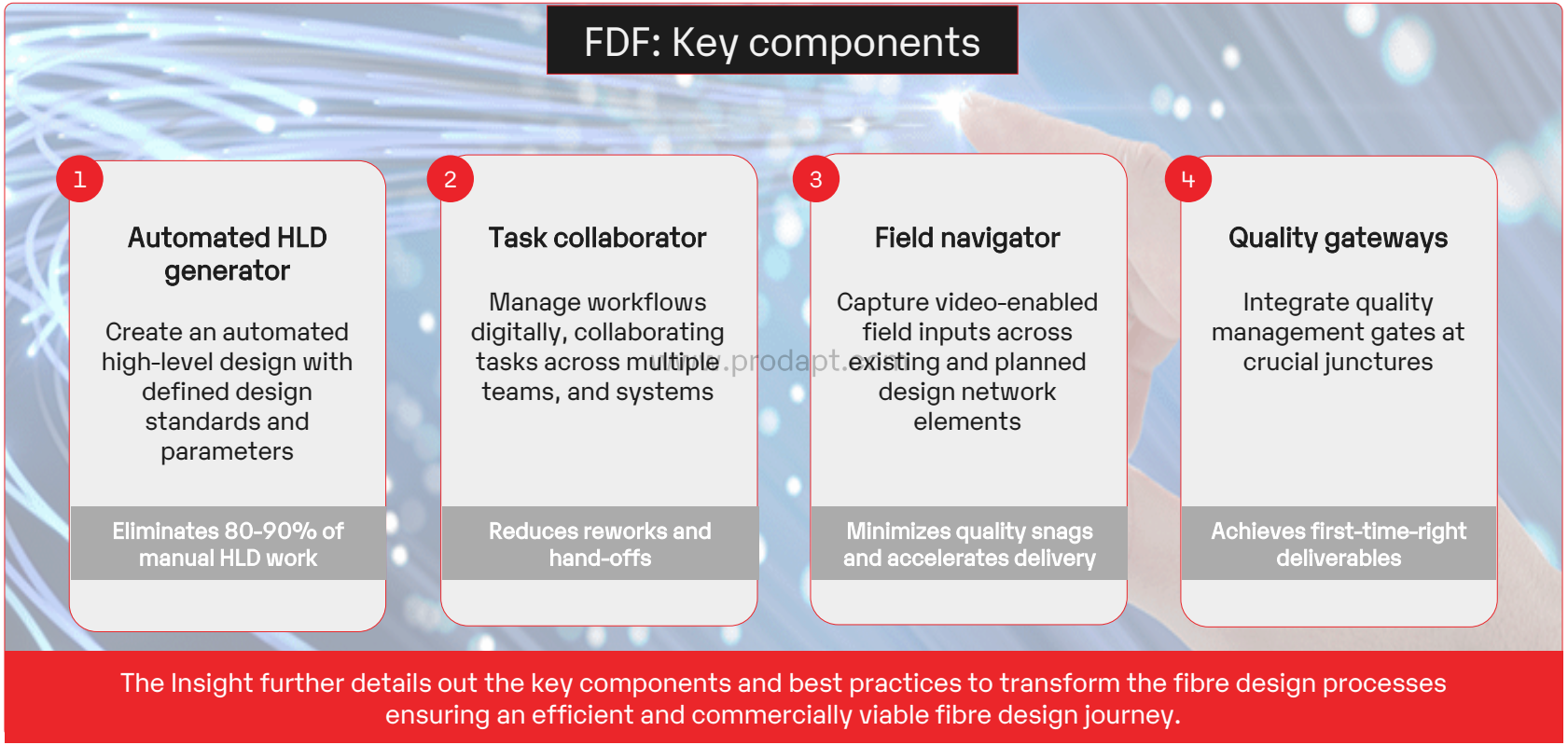


Key areas for automation

Digitization in the highlighted fibre design operations minimizes manual work and reworks, ensuring a right-first-time approach and accelerating design time by **~58%.**

Adopt a Fibre Design Framework (FDF) to automate key fibre design processes

Accelerate fibre rollout by 2X and ensure a right-first-time approach



The Insight further details out the key components and best practices to transform the fibre design processes ensuring an efficient and commercially viable fibre design journey.

Create an automated HLD with defined design standards and parameters

Manual HLD process

- Undergo **manual address validation** for received packages
- **Align the manual design** of the fiber network to customer-specific architecture (centralized, cascaded) and design standards like splitter ratios, cables, etc.
- **Draw a high-level HLD sketch and design across the CAD system and GIS platform**

Involves huge manual tasks leading to repeat work and errors

Use an **automated HLD generator tool** for a hassle-free, accurate and quick HLD

Embed the tool on top of the GIS platform across design locations, enabling it to identify layers, poles, ducts, etc.

→

Define architecture, build parameters, and **secondary-level details** in the tool, e.g., splitter ratios, splicing details, etc.

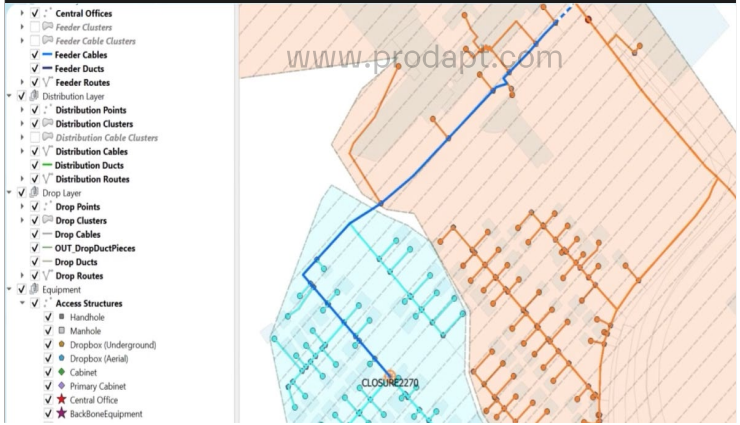
→

Get the **tool-generated design route maps** based on defined parameters

→

Validate, customize and finalize HLD

Automated HLD generator snapshots



Recommendations

- Define the existing and related power/utility infrastructure for design accuracy
- Outline the right architecture for any specific area to get a cost-optimized design
- Ensure minimal customization by the design engineers to achieve accurate and quality outputs
- Use the recommended automated generator to deliver outputs close to manual design quality

Using an automated HLD generator reduces the HLD creation and finalization time from 10-15 days to less than 2 days.

Manage workflows digitally, bringing together multiple teams and systems

The Current fibre design process orchestration

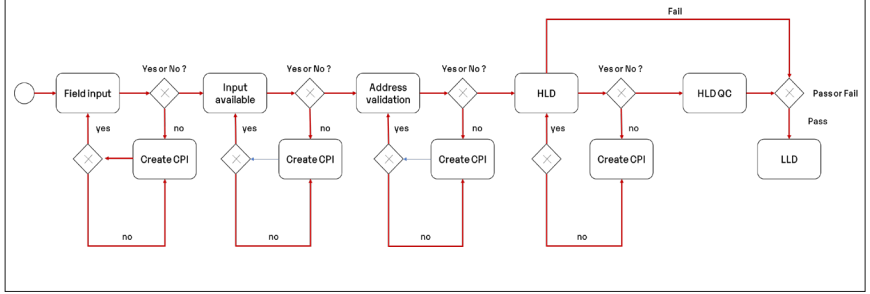
- Involves **multiple tasks** across the fibre design process, including collaboration with external teams
- Takes several **manual handoffs**; information is relayed across multiple teams, including **HLD, LLD, Field Survey, QA team**, etc.

Leads to information mismatch, missed information, and reworks

Leverage the **task collaborator** to automate tasks, reduce handoffs and repetition

- **Integrate the key systems and tools** (Automated HLD generator, Field navigator, etc.) with the task collaborator to centralize outputs and relay them to the respective agents/field technicians
- **Integrate HLD and LLD outputs** with templates for automated build packages like splitter information forms, permits, Bill of Material (BOM), etc.
- Create a **one-stop window with real-time updates** across processes

Task Collaborator



Recommendations

- Integrate the HLD generator, GIS tools, and field application for seamless information transfer
- Automate components for the LLD outputs, including SLD, BOM, etc., to deliver the right outputs
- Use a single-window view to manage multiple survey vendors and tasks related to design

The task collaborator provides a single line of transparency between the design team, on-field survey team, and build team for efficient coordination. It improves the degree of automation across the LLD documentation process by 55%.

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Navigate field details easily to capture inputs from current and planned network design

Current/manual field survey process

- The field technician **manually captures** field information
- The information is relayed to the design team in **free format** as notes, pictures, etc.

Leads to missed information and mismatches in the design outputs, forcing the team to repeat the survey

Use the **field navigator**, a geo-tagged solution to capture video-enabled on-the-field information

Integrate the field navigator with maps, enabling it to pick an exact point of the survey (street, pole, duct) and capture the inputs at that specific location about how it is impacting the existing design pattern

→

Capture inputs in the form of **video-based evidences** to know the fault location accurately

→

Transfer the information digitally to the GIS tool using the **task collaborator** for validation and amends by the design team

Geotagged capture of field details by locality

Recommendations

- Enable digitization to capture information without misses on the field for the relevant location, including permit/wayleave requirements
- Ensure backend integrations to enable modifications on the GIS design, eliminating handoffs
- Make sure that the design engineers validate survey input and approve changes across the design

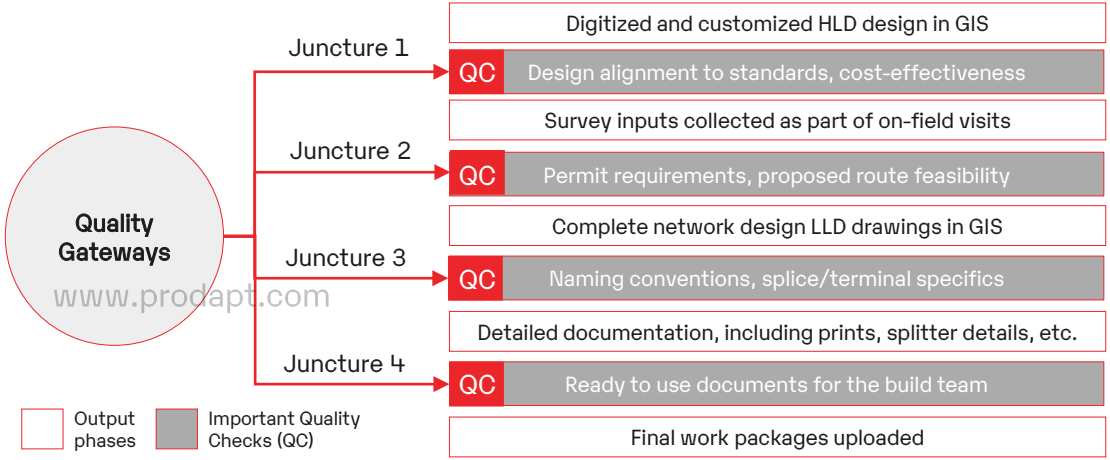
The field navigator reduces the HLD reworks and accelerates HLD finalization aligned to on-field inputs by 30%.

Integrate quality management gates at key junctures, ensuring first-time-right design outputs

Quality issue in design?

- Issue encountered during the build will require redoing the design
- Increases cost-per-house
- Impacts fibre rollout timelines

Establish **quality gateways** across the key output phases in the design journey



Best Practices

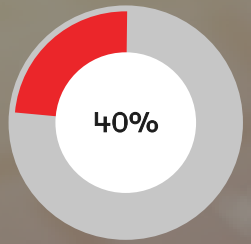
Leverage digitization levers (ML models & scripts) to validate the quality parameters, including splitter ratios, footage validations, naming conventions, etc.

Maintain standardized & defined checklists ensuring fiber splitter considerations, aligning safety measures to standards, validating optimal fibre footage, and ensuring documents are aligned to templates, conventions, etc.

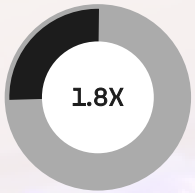
Enable integrated quality & design teams to incorporate modifications in the build phase due to final, unforeseen build change requirements.

Achieve 100% accuracy in audits, blending AI and human intelligence.

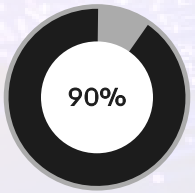
Business benefits achieved by the largest US wireline service provider by successfully implementing the FDF framework



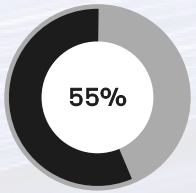
Cost reduction in the overall operations with enabled transparency and accuracy across the design journey



Accelerated design completion and time-to-market using an **automated HLD generator**



First-time-right design deliverables across HLD and LLD using **quality gateways**



Improved automation in documentation with **task collaborator**

Thank you

insights@prodapt.com