

# Innovation in the optical distribution network can deliver multiple benefits for FTTP operators

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FTTP deployments are continuing apace worldwide, but fibre operators face several challenges in successfully monetising their roll-outs. FTTP roll-outs require significant investment for passing premises, and deployments will incur ongoing operational expenditure costs. Deploying fibre is time consuming, which is important because operators stand to benefit from rolling out first and governments often set targets to roll out FTTP within a particular timeframe. FTTP operators must also ensure they keep their customers satisfied and deliver an optimal customer experience. In order to address these challenges, operators can use innovations in the optical distribution network (ODN). This article assesses how innovation in ODN physical architecture and ODN digitalisation can help FTTP operators to address their business challenges.

## Innovation in physical ODN architecture can deliver benefits for network roll-outs and customer installations

Innovation in ODN physical architecture includes pre-connectorised fibre. Pre-connectorised fibre means that segments of fibre terminate in connectors that can, in effect, be plugged into each other rather than requiring different segments of fibre cabling to be spliced together.

Pre-connectorised fibre can reduce costs because it removes the need for skilled splicing labour, a scarce resource in some territories, and avoids the need for fibre-splicing equipment. Deploying pre-connectorised fibre is quicker than using spliced fibre and can therefore reduce labour costs, and enable operators to quickly begin monetising their networks and meet government roll-out targets. With current deployment plans, most European countries will miss the European Commission 2025 target for all households to have access to downlink speeds of at least 100 Mbit/s upgradeable to 1 Gbit/s. Measures such as the use of pre-connectorised fibre that can increase the speed of FTTP roll-outs can help to close the gap.

FTTP operators could benefit from deploying hardened connectors that can be exposed to elements such as dust and water. Operators that use hardened connectors do not need to open terminal boxes when connecting fibres, a process that can take a few minutes. Opening terminal boxes can lead to reliability problems, particularly if contractors are paid by the number of connections made and are not incentivised to perform high-quality work, and this could push up costs and lead to a sub-optimal customer experience. Hardened connectors that are designed for specific deployment scenarios can also be useful. In some cases, ducts may have limited space available and so operators could attach hardened connectors to bullet head cables after they have been deployed in the duct.

Cascaded, daisy-chained ODN architecture with uneven splitters could be beneficial particularly when premises are spread out, for example, along a road or railway. Such architecture requires just one core distribution cable, which reduces deployment costs. Terminal boxes and fibre cables can be deployed in parallel, which simplifies and speeds up roll-out.

Using pre-connectorised fibre can deliver a best-in-class customer installation experience. Splicing fibre for an FTTP installation could take 60 minutes (30 minutes at each end of the cable), compared to 10 minutes (5 minutes at each end) when using pre-connectorised fibre. This convenience could improve subscriber take-up because lengthy installations requiring fibre splicing might discourage some customer sign-ups. Quicker installations also mean more can be performed per day with the same labour resources, which decreases subscriber waiting times while delivering a lower-cost installation process.

## FTTP operators should focus on digitalising their ODNs

Innovation in the ODN also includes digitalisation, which refers to the use of digital tools such as mobile apps and AI image-recognition technologies to automate processes in the lifecycle of the fibre network. ODN digitalisation can deliver benefits in the construction, installation and maintenance phases of fibre roll-out. Operators have traditionally recorded and labelled ODN resources in a cumbersome, labour-intensive manual fashion and so digitalising the ODN can reduce costs. Manual recording and labelling of ODN resources are also error-prone, for example, leading to difficulties in ensuring installations can be performed correctly and challenges in finding the location of faults.

Many fibre operators use sub-contractors to conduct their fibre roll-outs but sub-contractors may have incentives to work quickly and without the necessary concern for quality. ODN digitalisation enables operators to have better visibility of the fibre network and to check that sub-contractors have completed their tasks correctly during the construction phase of the roll-out. The traditional ODN acceptance process requires the use of specialised handheld optical time-domain reflectometer (OTDR) equipment but digitalising the ODN simplifies the process considerably and only requires one-click acceptance.

ODN digitalisation can help to ensure that the FTTP installation experience is a positive one. Some FTTP installations (as many as 30%) end up requiring a second engineer visit because of mislabelling of which fibres are connected to which ports. However, this challenge can be avoided with a digitalised ODN and operators can deliver right-first-time installations. With a digitalised ODN, operators can upload records of fibre resources using AI-based image recognition technology and a mobile app. This process can make operators aware of whether spare fibre ports are available before conducting an FTTP installation, which avoids the need for a costly preparatory site visit.

Fibre operators also need tools that allow them to find the precise location of faults. This can reduce service downtime and allow troubleshooting in less than a day compared to 2–3 days without ODN digitalisation. In this way, ODN digitalisation will improve customer satisfaction because faults will be quicker to resolve. Tools that can provide an automatic remote diagnosis of the nature of the fault have the potential to reduce unnecessary site visits by up to 40%, which can deliver large cost savings.

## Operators can use ODN-based innovations to differentiate themselves

FTTP operators can benefit in multiple ways from innovation in physical ODN architecture and ODN digitalisation. Operators should use these innovations to speed up roll-outs, which is increasingly important as multiple players see the benefits of deploying fibre and governments apply pressure to deploy. Operators that want to deliver a good-quality FTTP experience should focus on ODN innovation to improve their ability to provide reliable fibre installations and rectify faults more quickly.