



Fiber Factory

Open Telekom Cloud: Turbocharger for Network Rollout

Thanks to Telekom's fiber-optic rollout, over 33 million households in Germany already have access to speeds of over 50 Mbit/s. This already facilitates working from home, data-hungry streaming, and connecting business users. In the next step, Deutsche Telekom plans to expand the fiber-optic network for up to two million additional households each year starting in 2021. The rollout will involve extensive construction work. Scalable, secure resources from the Open Telekom Cloud are supporting the efficient planning of these measures.

The Fiber Factory, a division of Deutsche Telekom Technik GmbH, is responsible for planning the nationwide fiber-optic network. Until now, this had to be done by hand, as many processes had to be initiated and processed manually by the employees. However, thanks to the use of a geospatial data infrastructure (GDI) and an artificial neural network (ANN) developed by the Fraunhofer Institute for Physical Measurement Techniques IPM and operated in the Open Telekom Cloud, this is now a thing of the past. The goal: to plan up to 15 times more connections annually than before. The GDI was developed by Deutsche Telekom IT GmbH, which is also responsible for operating it for the Fiber Factory.

Deutsche Telekom and Fiber Factory

The Task: For the development of new rollout areas, planners used to have to photograph and manually evaluate all the locations themselves. In order to implement new fiber-optic networks more quickly, they were therefore looking for an automated solution. It would have been highly uneconomical to keep it in their own data center in the long term.

The Solution: Instead of the planners, the T-Surface Car now takes the photos on site. Artificial intelligence evaluates the data and determines the best routes for the fiber-optic networks. All the required computing and storage resources can be dynamically obtained from the Open Telekom Cloud in a pay-as-you-use model.

The Advantages: Deutsche Telekom Technik GmbH has been working with the cloud solution in live operation since January 2020. This allows planning processes to run faster and more efficiently so that significantly more rollout areas can be developed than before.



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The Customer: Fiber Factory

In the Fiber Factory, several thousand planners from numerous regional locations coordinate Telekom's fiber-optic rollout – right into the customer's home (fiber-to-the-home, FTTH). In doing so, they determine not only the optimum location for new cables, but also the project costs, including the anticipated material and personnel expenses.

The Challenge

Until now, it has been very complex and expensive to create rollout plans for new fiber-optic connections. During on-site inspections, the planners usually took several hundred photos and laboriously evaluated them manually. There was also no nationwide uniform procedure for determining the best possible route. As a result, the employees in Hesse proceeded differently than those in Bavaria or Lower Saxony.

The Solution

Deutsche Telekom Technik GmbH has been using a geospatial data infrastructure to optimally position new fiber-optic cables since 2018. Data from various sources, including land registry data, aerial photos, and live images from the T-Surface Car, are integrated into the infrastructure. The vehicle, which is equipped with laser scanners and cameras, takes photos and 3D point clouds and uses them to generate a two- and three-dimensional image of the rollout area. In order to operate the geospatial data infrastructure and process the collected data of up to 500 gigabytes per rollout area, the Fiber Factory requires extensive computing resources in a matter of seconds allowing for the swift creation of new rollout plans. The solution: dynamic IT capacities from the Open Telekom Cloud.

The photos and 3D point clouds taken by the T-Surface Car are then loaded into an Object Storage Service (OBS) bucket in the Open Telekom Cloud. In this way, employees don't have to worry about scarce storage resources, even with large data volumes. In the next step, the artificial neural network evaluates the data from the survey vehicle and classifies it according to 30 different surface and object types. To carry out the classification, the Open Telekom Cloud scales horizontally with 20 graphics processors (GPU VMs). The ANN has already been trained by the Fraunhofer Institute with over 90,000 photos and can thus be used as a docker container in the planning process.



All of this data is used to calculate the surface structure of the rollout area as accurately as possible. A process that runs automatically in the Open Telekom Cloud via several GPUs. A big plus: Usage is dynamic and based on the pay-as-you-use principle. This means that there are always sufficient resources available when employees plan the fiber-optic rollout for several areas in parallel. If less cloud capacity is required over a certain period of time, costs are also reduced. During the winter months, for example, when weather conditions prevent the system from being used, *rungsverhältnisse keine Befahrungen stattfinden können.*

The Customer Benefits

Since January 2020, the AI-based process in the Open Telekom Cloud has made it possible to calculate rollout costs much more accurately – and much more quickly and scalably than before. Automated planning can reduce the planning period by up to 75 percent and planners can turn their attention to other rollout areas. And the Fiber Factory is also on the safe side when it comes to data protection. When images are taken by the T-Surface Car, houses, people, or other sensitive information such as license plates are automatically rendered unrecognizable. In addition, the Open Telekom Cloud makes it possible to process and store all data in one of Deutsche Telekom's German data centers in full compliance with GDPR.

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