5G, Internet of Things, smart cities and intelligent vehicles boost data-hunger

'Fiber optics meets exploding broadband needs'

Looking into the future is a difficult task. Especially when it comes to fast-changing markets like IT and telecommunication. But there are two predictions that can easily be made. The first one is: the need for bandwidth and faster connectivity will only be increasing in the coming years. And the second one? Fiber optics will be playing an even bigger role, due to the growing bandwidth hunger.

Twenty years ago, internet access via ADSL was an excellent option for consumers and smaller companies. It provided the opportunity to be continuously online without extra costs, via the regular copper network. Uploading and downloading speeds of 512 Kb/s for downloading and 64 Kb/s for uploading, were more than enough at KPN, in October 2000. Currently, the need and the availability of broadband internet access is many times greater.

Currently already 100 Gb/s via fiber optics
Consumers can currently watch video streams with 500 Mb/s or 1 Gb/s via the 'regular' coax cable network. Anyone connected to a fiber optics network can go on the internet with even higher speeds. For the business market, fast connections, via fiber optics network, are also easily available. Organizations can currently purchase connections with speeds of up to 100 Gb/s on the nationwide fiber optic networks of operators Eurofiber and KPN.

Speed limit of fiber optics not yet reached
The limit for bandwidth and fiber optics has not nearly been reached yet. Without any major interventions, speeds of 400 Gb/s to 1.6 Tb/s are already a commercial reality with the current technology. Those speeds seem quite high, but the possibilities of fiber optics don't end there. At the beginning of February 2019, the German operator M-Net, in collaboration with the Finnish network manufacturer Nokia, managed to reach a maximum throughput speed of 50 Tb/s on a fiber optics connection between the cities of Munich and Regensburg – a distance of over 125 kilometers. The basis of this was a new technology, developed by employees of the Technical University of Munich. According to experts, that speed is also just a temporary limit.

5G provides further data explosion
It appears to be a given that the bandwidth hunger is only going to increase. Just the expected provision of (video) content at higher resolutions, such as 8K will ensure this. Other developments, such as the introduction of 5G networks for mobile (data) communication, will also cause a strong growth in the demand for continually faster connection speeds in the future. 5G in particular, is seen as a boost to the bandwidth need. Where 4G reaches peak speeds of up to 1 Gb/s

(download), 5G reaches up to 220 Gb/s. That piece of information, combined with other matters, such as minimal delay in data communication ('lag'), leads to the availability of new application options. For example, Augmented Reality, Virtual Reality and self-propelled vehicles that communicate in real time.

At first glance, it probably seems strange that a mobile communication standard, such as the soon to be rolled-out 5G is a boost for the purchase of bandwidth via the so-called fixed network connections. But all wireless data communication ultimately ends up in the ground at the various sending and receiving stations, from where it is transported to the operators' datacenters via fixed landlines. And there is another aspect of 5G. To get optimum coverage, a greater number of sending and receiving stations will be needed. An additional challenge is that all those extra stations will also have to be connected to fiber optics.

Cloud computing and Internet of Things
It is expected that in the business market, the demand for more bandwidth will also be explosive in the coming years. There are various reasons for this. One of them is the growing popularity of cloud computing, where the business world allows its employees to use applications and data from datacenters. The required data must be transported to and from the datacenters. Given the amount of data, fiber optic networks will absolutely be required for this. The cloud computing model also includes Internet of Things ('IoT'), devices that are linked to the internet. All those devices send information to a datacenter. For example, ASML, the Dutch manufacturer of machines that are used to manufacture computer chips. These systems daily send many Terabytes worth of information to ASML's datacenters, via dedicated fiber optic connections. This is a data stream that is only going to grow. The American chip manufacturer Intel calculated a few years ago that the average manufacturer with IoT technology generates about 40 Terabytes of data every day.

Smart cities are large consumers of data
Another reason for the commercial bandwidth hunger is the government. Digitization is commonplace not only in the public sector - with accompanying mountains of data -; a lot is also being invested in projects that will make urban areas 'smart'. Day to day 'Smart City'-projects are often based on a combination of technologies, such as Internet of Things, Artificial Intelligence and real time analysis of big amounts of data. These types of initiatives go beyond the installation of semi-intelligent streetlights or optimizing waste collection services. Municipalities are already thinking about things that will be not only desirable in the future, but that will even be a condition that will make the daily lives of citizens and the business world easier. Think of, for example, parking lots with sensors

that provide current information to smart cars in the vicinity. All those provisions require a network infrastructure, which is currently not able to handle those amounts of data communication. The investment in such an urban network must therefore be future-resistant. That is why nationwide and foreign municipalities (from Amsterdam to San Francisco) are opting for fiber optics as the ultimate future-resistant basis for their smart city projects.

Mapping networks
The increasing need for bandwidth and the further development of fiber optic networks linked to that have other implications as well, says Peterpaul Brundel, CFO of the Dutch software producer Speer IT. His company is the creator of Cocon, an application that evolved into the leading database which contains the majority of fixed and mobile network infrastructure – both below and above ground –." With the expected data explosion, whether it is via the cloud or 5G, expansion of the fiber optics networks is inevitable." It is good to know where all the cables are, not just for the expansion of fiber optics networks, Brundel comments. He points out that when there is a disruption in those networks, it is of crucial importance to know where the disruption is located. It looks like Speer IT's Cocon application is moving into a solid future.

Future-resistance is a requirement
To continue to manage the expected data explosion, the existing buyer and coax infrastructure are not sufficient. That much is clear by now, if we can believe the experts. Fiber optics is the only network infrastructure that will be able to handle the future demand. That is not only the opinion of technology experts. The Dutch government agency Autoriteit Consument en Markt (ACM) (Consumer and Market Authority) came to the same conclusion. The supervisory body commissioned a market study of the state of affairs regarding fiber optics in the Netherlands, in the autumn of 2019. The results of the study forced the ACM to state that 'extensive rollout of fiber optics is required to make telecommunication networks future-resistant'. Or as ACM puts it: "Fiber optic connections provide consumers with more freedom of choice. Fiber optics is also required to be able to meet the growing demand for bandwidth, now and in the future."

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