

WHY IS DOCSIS 3.1 SO IMPORTANT?

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Summary

DOCSIS 3.1 is the future for Internet connectivity. This new standard can be used to achieve extremely fast Internet connections. It does not require changing to other cabling systems, but only replacing the equipment that connect the cables. Denmark is the first country to perform such an upgrade. This will imply big changes to daily activities in Denmark and also create ground-breaking possibilities as to how we use the Internet. It is therefore necessary to acquire the necessary knowledge and be prepared as regards the future of the Internet.

DOCSIS 3.1

DOCSIS is an acronym for Data Over the Cable Service Interface Specification. The name covers the method used to send Internet signals via a cabled network.

DOCSIS 3.1 is a technical upgrade of COAX-Net, which is an upgrade of the copper network from its existing DOCSIS 3.0 version. Even though there is not a big difference in the name, the transformation is significant. Where the typical Internet speed of DOCSIS 3.0 is approximately 50-100 Mbit/s, it will be possible to offer customers a speed of 1000 Mbit/s or more with DOCSIS 3.1. The increased speeds will imply a significant advantage for households where there are several users, and where smart-TVs, telephones, tablets and laptops make use of the existing connection.

First on a global level

We can be proud that Denmark is the first country that will move entirely to this new technology. By doing this we can ensure that Denmark is assured a future broadband connection which matches the future Danish Internet and TV needs. Already from 2017, specific operators will be able to offer connectivity of up to 1000 Mbit/s.

Internet and TV consumption – yesterday, today and tomorrow

In the past, just 10-15 years ago, homes had a single computer connected to the Internet. There was typically only one or two TV sets in the household. Music and video was downloaded via telephones. The computer was a fixed stationary system with a large screen in an office. General Internet usage was limited to a few hours per week. There were a limited number of TV channels to choose between, and if you missed an episode of your favorite series on a Sunday evening, then you could only see it by purchasing it on DVD or VHS.

Usage of the internet today is quite different. Most TV sets are provided with HD. We have TV boxes that can record or spool transmissions. We can also rent movies directly from our sofa or stream them via Netflix or HBO. In a household with four members it is not uncommon that there is a minimum of 4 Television sets, 4 smartphones, 4 laptop computers and 2-4 tablets, all of which use the Internet connection, often simultaneously. We stream movies on TVs, work on computers and at the same time telephones are updated with the latest applications.

In present Denmark we are nearly always online. While in other European countries one is only online at regular intervals, in Denmark, use of the Internet has reached a different level entirely. For this reason the need for a strong connection is already

there, and will only become greater in the next few years. As network usage increases, so do the demands placed on the connectivity.

Streamed TV images will be clearer and the need for a more powerful connection will be greater. In pace with the acceptance and use of, for example, virtual reality, augmented reality and "Internet of things", the demand for a quick, robust and stable connection to the surrounding world will increase. We are saving at an increasing rate these large files in the "cloud", and the need for synchronization via the Internet will also increase.

How DOCSIS 3.1 works

Operators have begun to upgrade their coax networks that deliver TV, broadband and telephony to Danish households. DOCSIS 3.1 is applied by upgrading the frequency-dependent products in the existing DOCSIS 3.0 solution, thereby making it a DOCSIS 3.1 solution. Instead of replacing the existing copper cables with a different technology, the existing cable is simply reused and the equipment that connects the cables is replaced.

Imagine a coax network with DOCSIS 3.0 as a two lane highway. Each car on the highway transports one person, and the capacity of the highway allows 100.000 commuters to use the highway per day. Replacing the equipment to support DOCSIS 3.1 is equivalent to expanding the highway to four lanes. The number of commuters per car is doubled by "packing" the commuters better, now allowing two per car instead of one. This results in DOCSIS 3.1 allowing 400.000 to use the highway per day in contrast to the 100.000 that use today's DOCSIS 3.0 highway.

This may sound simplistic, but the analogy is quite accurate. The frequency band used to send Internet via the cables is expanded. This is, amongst other things, why FM signals on cable networks tend to disappear. Furthermore, TV and Internet signals are "packed" better than they are today. Larger roads, more room for cars and more commuters per vehicle. These better-packed signals also make the

broadband network more subject to "noise" and foreign signals. Attenuation by shielding of the entire installation must be considered prior to moving from 3.0 to 3.1. In many situations, the new equipment must be better to prevent noise in the connection when compared with currently used equipment.

How DOCSIS 3.1 will change Internet and TV

When the upgrade has completed, it will be possible to view TV transmissions in much better quality than presently. The higher the quality of a specific channel is, the greater the bandwidth that is required. For example, in the future it will be easier to see "Ultra-High Definition" 4k TV with DOCSIS 3.1. The different way of packing signals will not only provide faster Internet connectivity, but will also prevent the connection from being loaded when many different devices simultaneously use the connection.

When streaming at home, one will for example, experience that Netflix is far smoother and the picture and sound quality are vastly improved in comparison with that seen today. This also means that to exploit the full potential of the faster connection, the wireless network (Wi-Fi) in the home must be re-evaluated. Today, it is routine to place the MODEM or router in the center of the house, and use this as the only Access Point to the Internet. Due to the larger quantities of data and the larger number of devices in the future that will use the household's Wi-Fi, it may be necessary to have extra "Access Points" that support and make the network in the home more stable and robust.

Upgrade implications for the specific household

The effect of an upgrade depends upon the Internet provider being used. If one has an antenna committee or similar, then in most cases this will mean that the Internet

and TV signals will be disrupted for short periods while the equipment is being replaced.

Even though most of the replacement of equipment occurs away from the individual household, the households will be required to evaluate their own installations. Some households will also need to modify the configuration of the home's own wireless network, and the way in which the Internet signals are transferred to the various rooms. This is because the demands made on the MODEM can vary.

Furthermore, many homes will need to reposition the location of the Internet MODEM. The router or MODEM must be placed at the determination point, being the first outlet in the home.

The exact changes are something that the specific antenna committee or Internet provider will know more about, and they will definitely inform you accordingly when a decision needs to be taken. It is however certain that some antenna sockets and the MODEM will need to be replaced to gain full benefit from the upgrade. You should also expect that the frequencies of your channels will be changed and must be reinstalled on the TVs.

Specific questions regarding how your situation can change in the new installation, the time when the household changes signal, or the type of equipment that is to be replaced, are best directed to your Internet provider and antenna committee.