

HIGHLIGHTS

ICOTERA • APRIL 2019

Icotera shapes the future

A dedicated focus and close cooperation with ISPs and Network Operators is the key to success.

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ICONS - next level of support

Comprehensive support insights for real-time network and in-home Wi-Fi troubleshooting and analyzing.

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New Wi-Fi 6 standard

10 times faster speed and what to expect when the next generation Wi-Fi hits Europe this autumn.

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HIGHLIGHTS - AN UPDATE ON ICOTERA, INDUSTRY TRENDS AND TECHNOLOGIES

Welcome to HIGHLIGHTS

With HIGHLIGHTS we want to keep you updated on our business, products and solutions, but we also want to inspire and bring focus on more industry and technological related topics. In this issue we have focused around many of the exciting things that are shaping the future for the ISPs and network operators in Europe. New technologies are being introduced and at the same time open access becomes the standard with both the opportunities and threats this brings.

At the same time Wi-Fi also plays a bigger and bigger role with increasing fiber speeds and at Icotera we want to play a key role for the ISPs providing the right support tools to help customers and their in-home issues. At the same time there is a technology shift on the way where new standards will help the ISPs and network providers deliver much strong Wi-Fi solutions to their customers in the future.

Happy reading....

“ Wi-Fi plays a bigger and bigger role with increasing fiber speeds.



Erik Sør-Pedersen,
Chief Sales Officer at Icotera

ICOTERA **SHAPES THE FUTURE** TOGETHER WITH ISPS AND NETWORK OPERATORS

Since 'Maj Invest', the Danish private equity fund, acquired Icotera almost two years ago, the strategy has been clear. It is based on three equally important lines of activities. International growth – a broader product portfolio keeping the high customer satisfaction through customer support and increased product innovation and development.

Growing portfolio

So far, it has been quite a journey. We have developed and launched a new generation of CPE's. Also, the portfolio has been updated with Wi-Fi access points with MESH capabilities. And we have introduced ICONS – our end-to-end real time network monitoring solution.

Six new markets

In Denmark Icotera is market leader within residential fiber CPE's, and from this important base we are expanding our market reach in the highest possible pace. We have entered several new markets, includ-

ing Norway, Sweden, France, the UK, Germany and Austria. It is an exciting journey and we are far from settled.

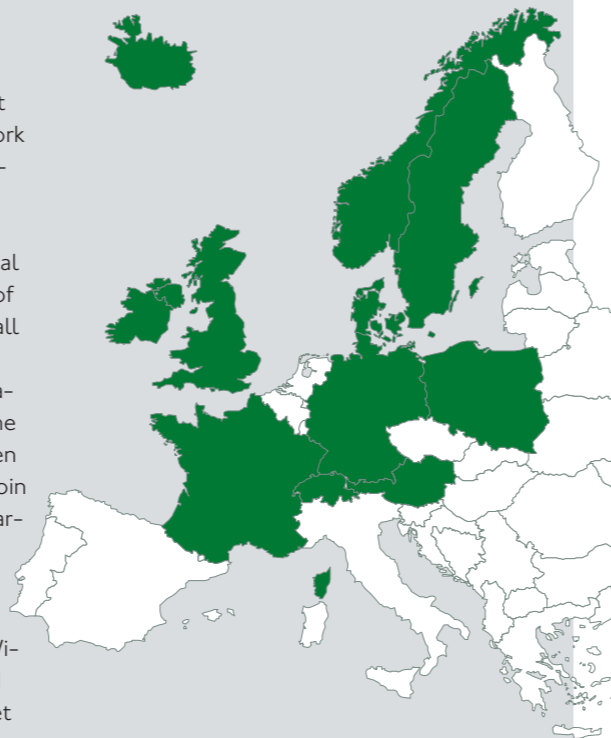
Dedicated focus

Our approach to each and every market is a dedicated and strong ISP and Network Operator focus in order to create excellent customer solutions and satisfied customers. We do so by making sure to combine the joint forces of the individual ISP and Network Operator knowledge of the market together with Icotera's overall understanding of how to solve specific needs in the market. This close cooperation is key to success for both the ISP, the Network Operator and Icotera, and often workshops are a very effective tool to join forces and to create the outstanding market solutions.

Roadmap

In our roadmap we have products for Wi-Fi 6 (802.11ax) as well as XGS-PON and 2.5Gbps routers. And in line with market

demands our portfolio fully supports the aspects of Open Access.



ABOUT MAJ INVEST EQUITY

With a total commitment of approx. DKK 4.3 billion, Maj Invest Equity is a leading private equity player in Denmark. Maj Invest Equity focuses on medium-sized and larger companies and currently manages a total portfolio of 17 companies. Maj Invest Equity recently raised its fifth fund with an expected commitment of DKK 2.2bn at final closing. Since 2005, Maj Invest Equity has invested in more than 35

companies, and in the same period sold more than 40 companies. Maj Invest Equity is a part of the Maj Invest-group, which covers asset management and private banking, and operates under the same investment principles as outlined in the UN Principles for Responsible Investment (UN PRI).

For further information see: www.majinvest.com

**MAJ
INVEST**

ICONS – THE NEXT LEVEL OF ISP SUPPORT

ICONS is about intelligent insights. It is Icotera's network monitoring solution tool which gives the Network Operators and Service Providers the opportunity to substantially reduce and shorten support calls. This is possible by offering enhanced capabilities for end-user support and network performance diagnostics.

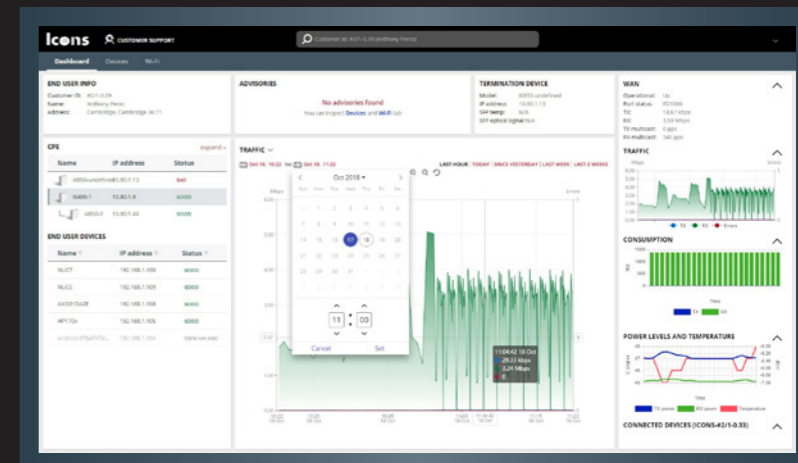
This is how ICONS works: It gathers, analyses and processes information which enables Operations to initiate proactive and preemptive fault handling. The result is a remarkably faster problem-solving time for the customer support center.

Wi-Fi network analysis

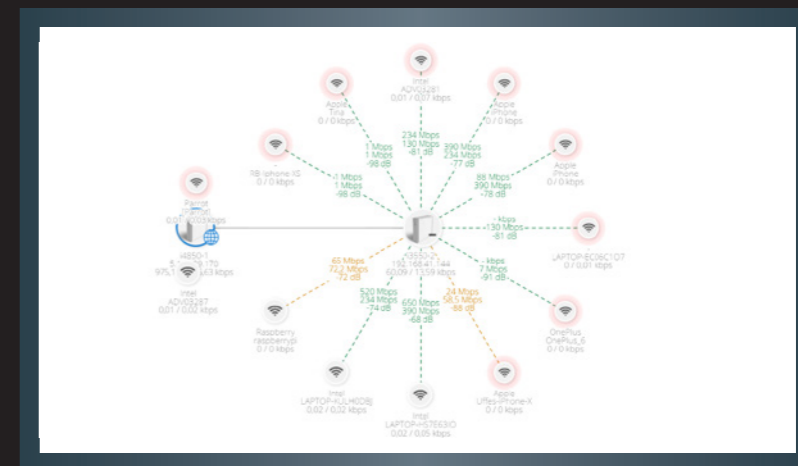
ICONS performs full Wi-Fi network analysis. Based on given parameters, an advisory module finds the concerned in-home devices, and analyses both the history and current state. The conclusions reached from the tool is used to present not only an identified issue but also to suggest remedy. In this way ICONS will help Network Operators and Service Providers to optimize the end-user support.

Interested in knowing more?
If you want to know more about ICONS, please contact us at sales@icotera.com

Icons
ICOTERA NETWORK SURVEILLANCE



Dashboard section provides a thorough overview showing end-user info, proactive advisories, troubleshoot issues happening back in time.



Real-time Wi-Fi environment: Routers, access points, media converters and end-user devices are displayed in their current topology. This provides a snapshot to the support technician on how it looks at the customer premises.

NEW WI-FI STANDARD REINVENTS SPEED X 10

Wi-Fi 6: What to Expect and Why American Routers Aren't Build for the European Market



The next generation Wi-Fi hits Europe this autumn. Samsung's Galaxy S10 and the new iPhone from Apple are both running the

802.11ax standard - also referred to as Wi-Fi 6, and with devices enabling 10 times faster Wi-Fi, customers will naturally expect networks supporting the technology and Wi-Fi 6 will thus become a competitive advantage.

Expectations to the new wireless technology range from better stability to reduced costs and less carbon emissions. This story is about some of the things Wi-Fi 6 can do for you, your company, and for the society.

All over Europe, more and more fiber optic cables are put in the ground. Thus, providing more Europeans with lightning-fast fiber-to-the-home. However, the super-highway has a few potholes, which means we cannot really put the pedal to the metal just yet.

In general, European internet service providers report that as much as 72% of all calls to their help desks involves in-home performance issues. It goes without saying

that customer satisfaction suffers when the necessary coverage just isn't there. Customers simply want to experience the bandwidth they are paying for at their devices.

Erik Sjøe-Pedersen, Chief Sales Officer at Icotera, understands the difficulty ISPs are facing. "The problem is that the wireless bands are overloaded. Today too many disturbing elements utilize the bands inappropriately and we therefore need technology to help prioritize and solve the insufficient speed issues."

"The current generation of wireless technology is not good enough to meet the requirements of today's customers," Erik Sjøe-Pedersen says. He points out that wireless fidelity, or the lack of, and the routers' bad signal strength at the end of the signal are some of the concerns we are facing with the current generation of wireless technology. The solution has been in the works for quite some time now, and we are about to see a jump from 802.11ac to 802.11ax - or in popular terms; Wi-Fi 6.

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"The wireless bands are overloaded. Too many disturbing elements utilize the bands inappropriately - we need technology to help prioritize and solve the insufficient speed issues."

Erik Sjøe-Pedersen,
Chief Sales Officer at Icotera

You Know the Name, You Know the Number

Consumers and organizations will get better Wi-Fi which will transfer data up to ten times the capability of Wi-Fi 5. However, the stroke of genius lies somewhere else, if you ask Birgitte Hass, CEO of Denmark's leading industry association for IT- and telecommunications, IT-Branchen.

"To call the technology Wi-Fi 6, and not 802.11ax, is a great idea," Birgitte Hass says, "it democratizes the knowledge of technological leapfrogging. Nobody understands what it means to go from 802.11ac to 802.11ax. But to go from Wi-Fi 5 to Wi-Fi 6 is something everyone can comprehend".

Birgitte Hass explains that the sheer simplicity of the name will enable consumers to look for devices, which supports Wi-Fi 6. This is important as the growth of a so-

ciety requires the consumers to embrace technological evolution - and understand how to utilize its possibilities like Virtual Reality, Augmented Reality and streaming in 4K.

The CEO of IT-Branchen outlines how society needs technologies like Wi-Fi 6 to improve infrastructure. Such improvements will enable businesses to reduce costs and ultimately have a positive effect on the environment. She uses international meetings as an example. Next-generation Wi-Fi will enable companies to host international meetings online. In the future, we can have virtual meetings where it would seem as if all parties are physically present in one location. This will reduce the need to get on an airplane, which in turn will reduce carbon emissions. Birgitte Hass has no doubt that it is the digitalization which will save the planet.

To be continued on next page...



"Society needs technologies like Wi-Fi 6 to improve infrastructure, reduce costs and benefit the environment."

Birgitte Hass,
CEO of Association of
IT- and Telecommunications,
IT-Branchen

Did you know?

Wi-Fi 6 will also lead to longer battery life in devices, such as smartphones and laptops, that support Wi-Fi 6 because of a new feature called 'target wake time, or TWT.

Whenever an access point speaks to your phone or other devices, it tells your

phone when to activate its Wi-Fi radio or put it to sleep and wait for the next transmission. This feature conserves power because of the Wi-Fi radio's dormant condition, which in turn results in longer battery life.

Source: www.howtogeek.com

“As much as 72% of all calls to European ISP’s help desks, involves in-home wireless issues...”

Great for the Americans, Bad for the Europeans

Wireless technology companies like Quantenna, Qualcomm, Broadcom and Realtek all work dedicated on developing tomorrow’s solutions. From the perspectives of Erik Søre-Pedersen, Icotera, it is a problem that most routers are based on a technology developed for the US market. Americans live in huge houses which are typically far apart from each other, they are bigger and made of light materials. Living conditions that calls for a Tri-Band solution. In Europe, we typically live in densely populated areas. We live in apartment buildings and brick houses. European living conditions call for routers, which can send out a loud signal with a long reach and with as many antennas as possible. Most European homes have several smartphones, tablets, flat screens and computers and they all need to be connected at the same time.

This presents a problem for the common household when using a Tri-Band router in surroundings which block the signal. But is this not just corridor talk in the industry? No, even in the research community, this problem has popped up on the radar. Jimmy Jessen Nielsen works as an associate professor at the Department of Electronic Systems, Aalborg University, and holds a Ph. D. in Wireless Communication. He can easily recognize the issue with routers which are unable to penetrate brick walls, concrete and steel.

Jimmy Jessen Nielsen uses his own house as an example as he had to set up multiple Wi-Fi access points to ensure reliable wireless internet throughout his

entire home. Icotera’s Erik Søre-Pedersen reveals that the issue will go away with Icotera-routers, because they deliver a long-range solution, as they are built for European homes. And with Wi-Fi 6 routers from Icotera, performance will be good even far away from the main router in the house.

What Else Can We Expect?

Stephane Renaud has an answer. He is the Senior Product Manager at Quantenna Communications. When you buy a Wi-Fi 6 router from Icotera, it is powered by a Quantenna-chipset. Stephane Renaud explains that the big promise with 11ax isn’t speed, even though Quantenna has unique assets to offer faster Access Points than competition. No, it’s efficiency; stronger signal, better stability and improved ability to handle interference from competing signals.

“The core technology of Wi-Fi 6 is something called ‘OFDMA’ which is inherited from 4G and already deployed in the mobile world. It allows a new dimension of transferring information from an access point to multiple clients,” Stephane Renaud says.

He describes how you get parallel communication with OFDMA, which allows the access point to break up information into chunks. These chunks are then sent out to various clients. Instead of one client is fed with all the information at once, while the other wait, parallel communication gives one client a chunk, then a chunk to the second client, then the third and so on. This will result in reduced latency in,

for example, dense office buildings with multiple clients awaiting data. The same enhanced effect should be experienced by consumers and gamers in similar dense environments.

Also, Wi-Fi 6 opens new channels of data transfer, most commonly referred to as ‘6 GHz band’ providing more space for the consumer to operate with. This means less interference as fewer people will be using the same channels in the same neighborhood.

To be continued on next page...



“Wi-Fi 6 is about less interference.”

Stephane Renaud,
Senior Product Manager
at Quantenna Communications

Won’t 5G Make Wi-Fi 6 Routers Obsolete?

Not according to Jimmy Jessen Nielsen of Aalborg University. In fact, Wi-Fi 6 and 5G will complement each other – just like 4G and 11ac do today. He points out that the individual mobile operators only have a fixed bandwidth to serve all users in a geographical area. Imagine a large number of people in the same neighborhood uses 5G to stream Virtual Reality at the same time. In such a case, a lot of extra 5G base stations will be needed to support the required data transfer, unless Wi-Fi 6 and wired internet connections are used to offload some of the traffic.

Also, the signal is drastically weakened when it penetrates huge office buildings – such buildings rely on routers for a signal inside. At the same time, routers have a short range and without 5G, people will not be able to take the internet with them after they have taken a certain number of steps away from a router.

Wi-Fi 6 and You

The shift to Wi-Fi 6 is not going to be free of charge. Birgitte Hass points out that the launch of a new technology calls for upgrading. People will have to buy devices being ready for Wi-Fi 6. And businesses need to upgrade their infrastructure. This, of course, comes at a certain price.

Erik Søre-Pedersen advises internet service providers, businesses and consumers to take a step back and look at their individual needs. With the expected hype on Wi-Fi 6, you would easily imagine that you need to invest in a jumbo jet. But that might not be the case as you don’t need

to upgrade all of your devices and solutions from day one of Wi-Fi 6. You will be able to exploit some of the benefits of next generation Wi-Fi with certain services, devices and computers. How, will depend on the provider, the consumer or the company. Therefore, Icotera is ready to meet to perspective the possibilities with Wi-Fi 6, launch dates in specific regions, and how to get ready for the next step in wireless fidelity, points out Erik Søre-Pedersen.



“Most routers are based on a technology developed for the US market.”

Jimmy Jessen Nielsen,
Associate Professor at the
Department of Electronic Systems,
Aalborg University



Fast Facts

1. Wi-Fi 6 rolls out in the autumn of 2019
2. Better to use the terminology: “Wi-Fi 6” than: “We move from 802.11ac to 802.11ax”
3. Different router needs in the US and in Europe
4. Icotera develops solutions for the European market
5. Wi-Fi 6 and 5G will complement each other well



EVENT UPDATE MEET US...

During spring 2019 Icotera participates at various conferences throughout Europe and we are looking forward to meeting and presenting our products and solutions to new and existing customers.

We welcome everybody at our stands - See you!

COLOGNE

ANGA COM 2019 - 4-6 June, Cologne, Germany
ANGA COM is Europe's leading business platform for broadband operators and content providers.
Meet Icotera in Hall 7 at stand A53



LONDON

Connected Britain 2019 - 18-19 June, London, UK
The conference where the biggest players in UK connectivity meet.
Meet Icotera at stand 35.



