



INTERNET AS IT
SHOULD BE



Martin Jürgensen
April 2019

ABOUT WAOO

- Waoo is a Danish Internet Service Provider
- Pure Fiber to the home
- 350.000+ Connected homes.
- 1.000.000+ homes passed (potential costumers)
- 150.000+ TV customers
- Waoo is the challenger in the market
- Denmark is fully penetrated -> cannibalizing on competitors

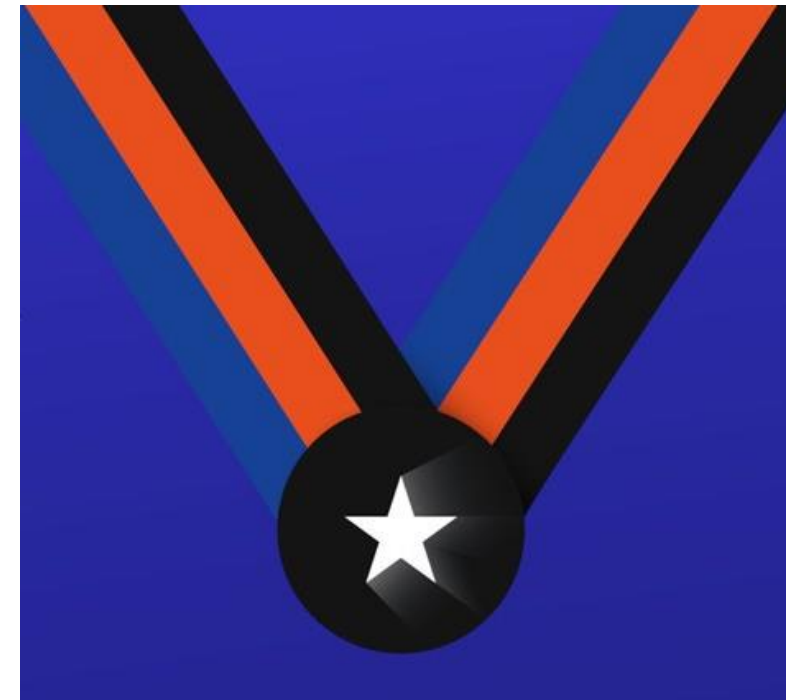
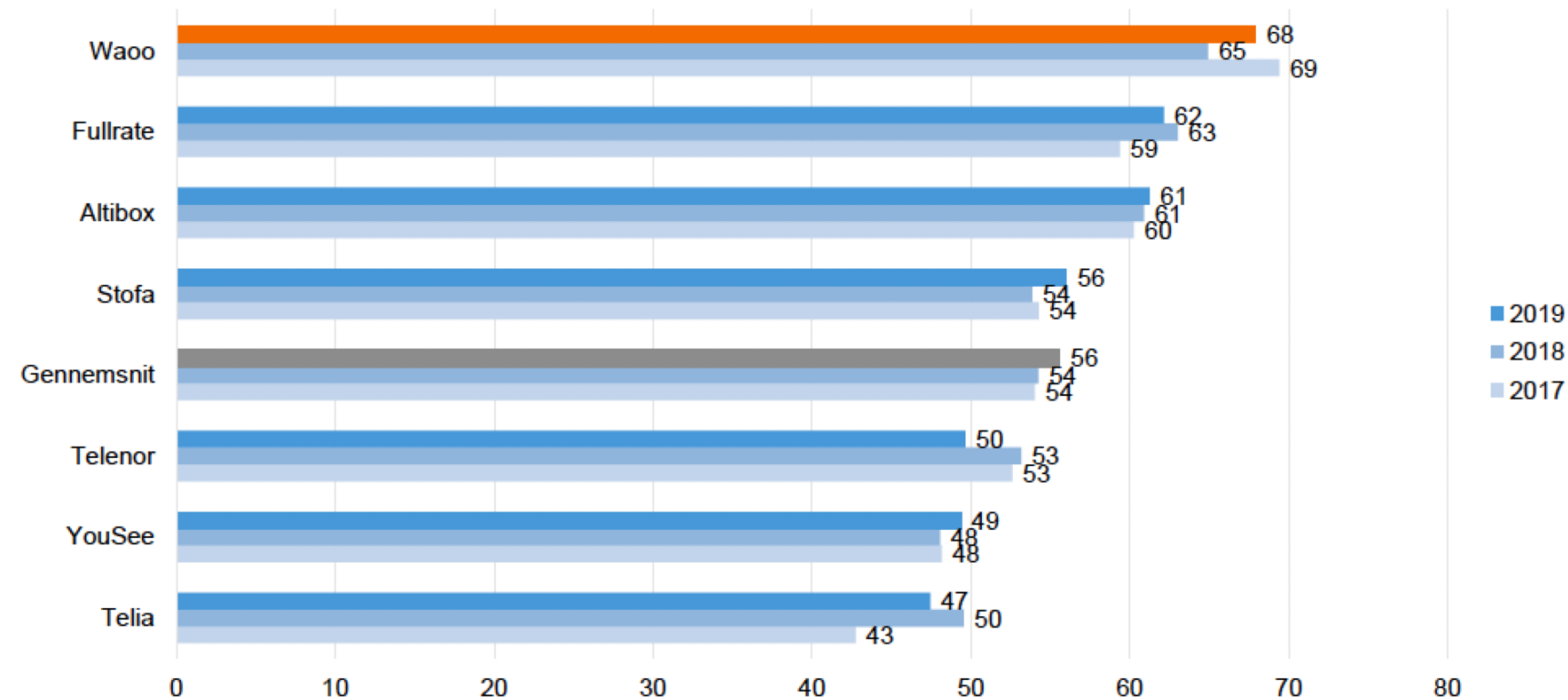
**DENMARKS LEADING
SUPPLIER
OF INTERNET, TV AND
TELEPHONY**

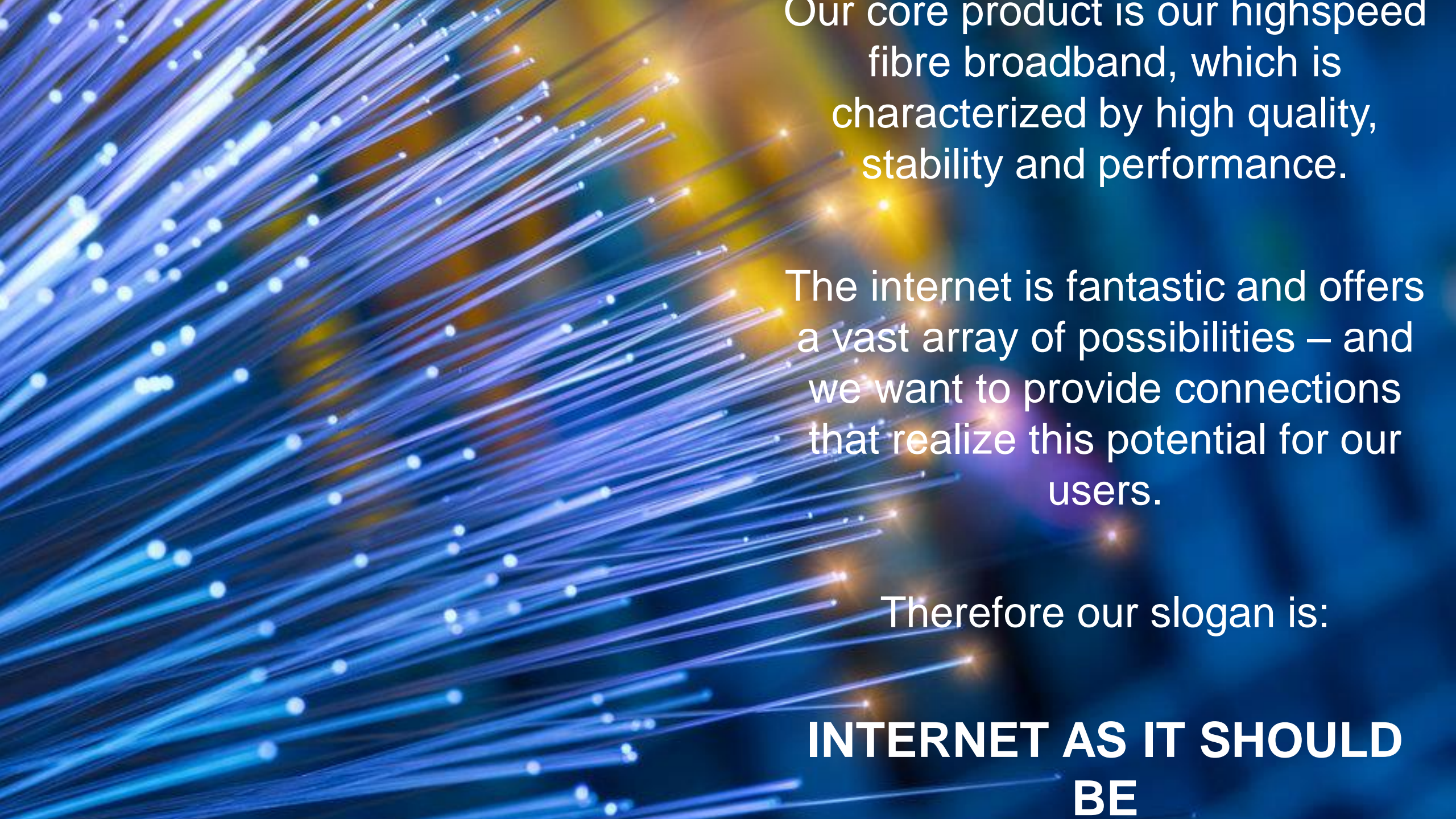


DENMARKS BEST INTERNET

Loyalitetsindekset

ROW





Our core product is our highspeed
fibre broadband, which is
characterized by high quality,
stability and performance.

The internet is fantastic and offers
a vast array of possibilities – and
we want to provide connections
that realize this potential for our
users.

Therefore our slogan is:

**INTERNET AS IT SHOULD
BE**

SPEED GUARANTEE

WAOC PROVIDES SPEED GUARANTEE

- We over-provision with 5-10% to the gateway
- Customers gets at least 100/100, 300/300 or 500/500
- No guarantee over WiFi (Yet)



HASTIGHEDSGARANTI

TESTDINHASTIGHED.DK



WAOO SMART WIFI

THE CONCEPT



Change of Mindset and Go-To-Market

To

An inspiring brand that provides solutions that realizes the full potential of the internet

– experiences!

SHIFT

From

A “classic” Telco ISP approach with a focus on rational messages – speed!



WAOO SMART WIFI

The WiFi-set always ensures the most optimal WiFi-signal in all parts of the home – and therefore helps getting the most out of a Waoos fibre connection.



SMART WIFI - THE CONCEPT

Survey

- Conjoint survey shows WiFi was most important (after price).
- Speed, speed guarantee, Online storage etc was less important.

Our philosophy about high speed and WiFi

- It is all about convenience
 - When you try high speed over WiFi you will never go back.
- WiFi like water - flows everywhere
 - You need a bigger pipe to fill your bathtub compared to washing your hands



SMART
rnet **WIFI**

Our rational to do this was:

- Primary: Experience value of internet
- Secondary: Increase ARPU
- 2/3 is private houses and 1/3 Multi Dwelling Units
- We typically deliver a set of 2 MESH units.
- They are pre-paired + extra clients can be added
- Single packs sold to small apartments
- Rental concept – not buy



SMART WIFI – TECH FACTS

Wao Smart WiFi is our intelligent WiFi-solution using MESH-technology.

Air4920

- 1600 Mbps 3x3 802.11ac + 2x2 802.11n
- Wireless MESH Extender
- Produced by AirTies
- Factory pre-paired as a set
- Supports video (multicast) and data
- Supports Ethernet Backhaul
- Easy addition of extra unit
- Config sharing
- The WiFi-solution can be controlled via a smartphone app



SMART WIFI

- Price and speed was previously the main arguments
- The real value is what the consumer EXPERIENCES
- Before: 6-7 different price points.
- Now: 3 basic packages:

One standard and two premium:

- 100/100 - Standard WiFi (gateway) + security (\$42)
- 300/300 - **Smart WiFi** - Security - Online storage - Full installation \$50,- (\$8 extra)
- 500/500 - **Smart WiFi** - Security - bigger Online Storage - Full installation - Always newest equipment (\$64,-)
- Two highest price points includes **Wao Smart WiFi**
- 150.000 MESH units (incl. TV-box)
- More than 90.000 homes



Simplicity, Premium, Smart-WiFi

- A premium service
- WiFi Included in our top tier packa
- Integrated with wireless TV



WAOO FIBER BASIC	WAOO FIBER EXTRA	WAOO FIBER FULL
<ul style="list-style-type: none"> • 100/100 Mbit/s • Waoo Standard WiFi • Sikkerhedspakke 	<ul style="list-style-type: none"> • 300/300 Mbit/s • Waoo Smart WiFi • Sikkerhedspakke • 25 GB online harddisk • Waoo Udvidet Installation 	<ul style="list-style-type: none"> • 500/500 Mbit/s • Waoo Smart WiFi • Sikkerhedspakke • 100 GB online harddisk • Waoo Udvidet Installation • Altid det nyeste Waoo-udstyr



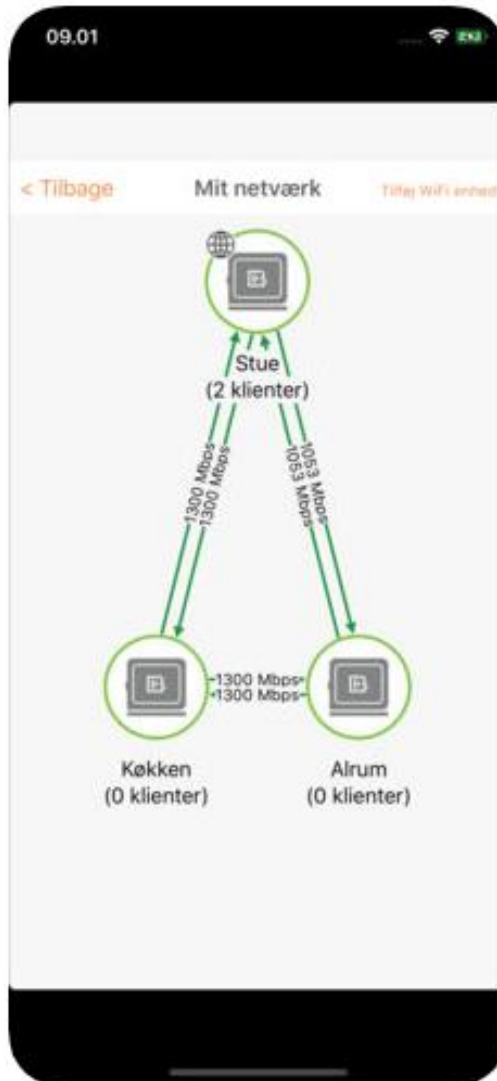
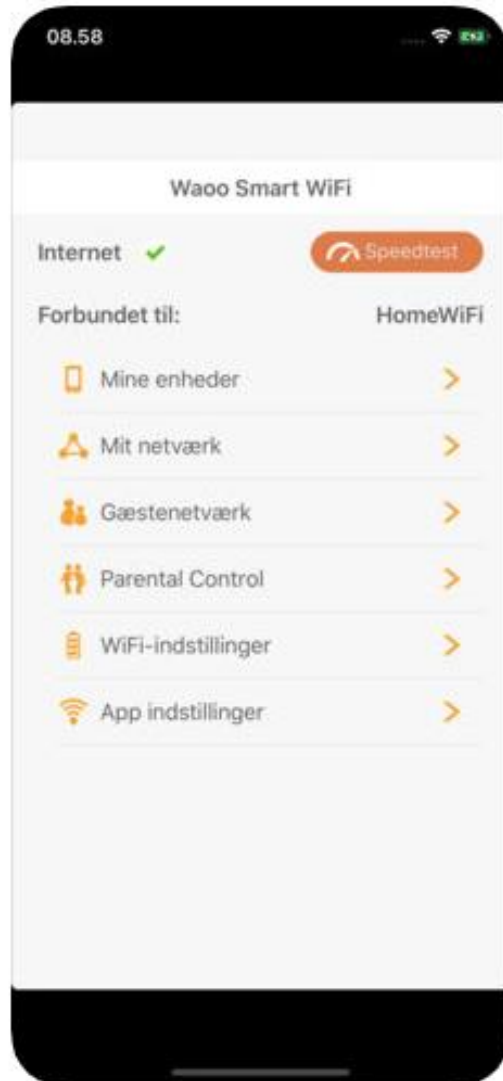
SMART WIFI APP

SELF SERVICE APP

- Easy installation
- Monitor network
- Manage devices
- Parental control
- Guest SSID



SMART WIFI



TV BOX



TV box includes a WiFi access point as part of the MESH.



TV BOX

TV box includes a WiFi access point
as part of the MESH.



SMART WIFI

- This is **WiFi as a service** - we need to be able to support and monitor them to give good service.
- TV box includes a WiFi access point as part of the MESH.
- We are not in control of the gateway - 30 different models.
- We always deliver 2 MESH units.
- They are pre-paired - extra clients can be added
- Cloud monitoring – Remote Management
- App to help install and monitor the setup.





REMOTE

Statistics Overview

All Domains

149.024

Access Points

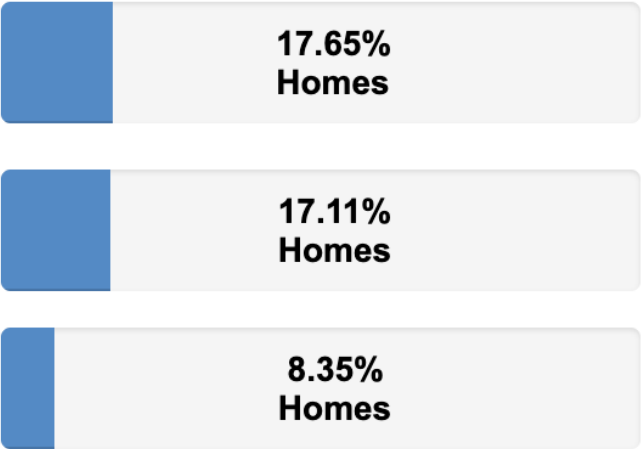
461.427

Total Wireless Devices

1.95 GB

Average Download per Day per Device

Recommended Actions



Candidates for broadband upgrade

High number of clients, heavy downloads, high end device profile detected, needs fast broadband



Candidates for Wi-Fi network upgrade

Coverage problems detected, needs extenders



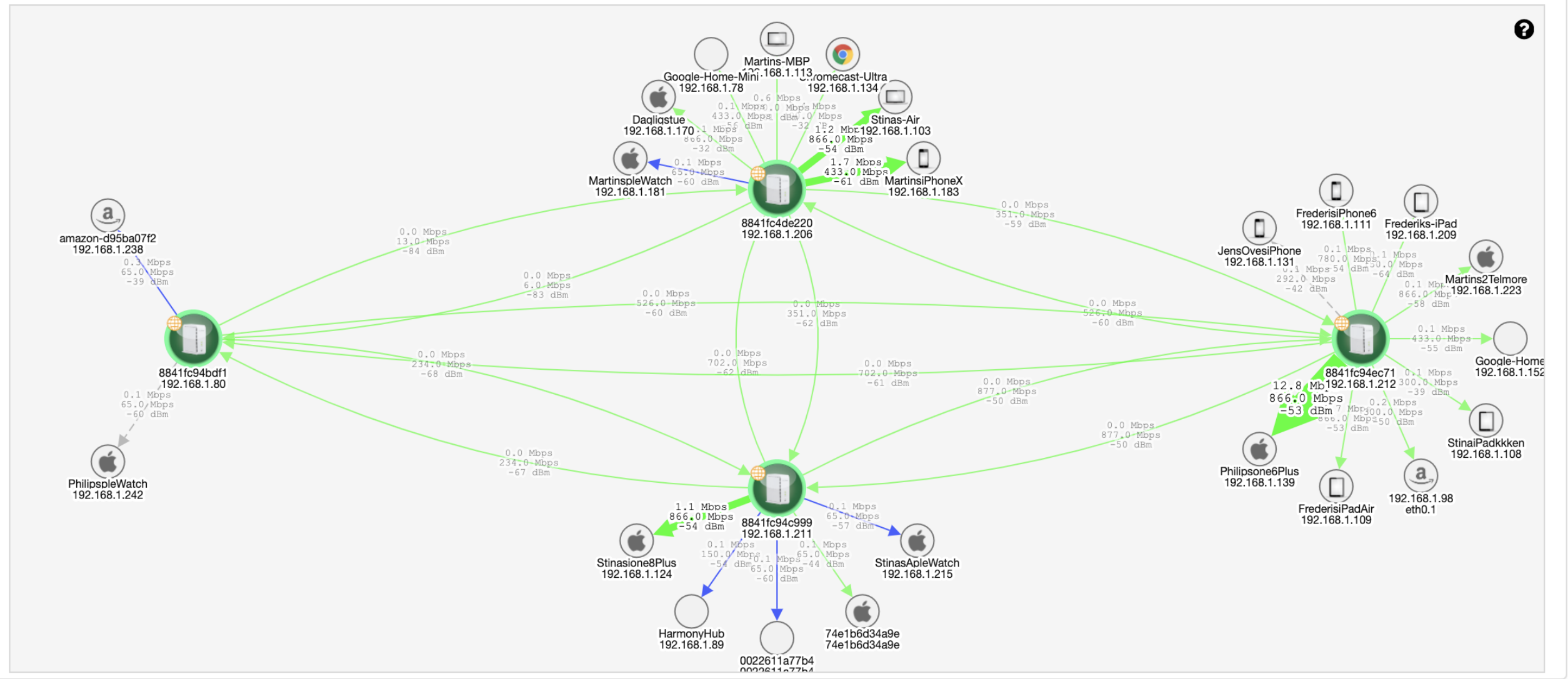
Candidates for wireless device upgrade

Low end wireless devices detected, usage pattern justifies high end, recommend upgrading customer's wireless devices

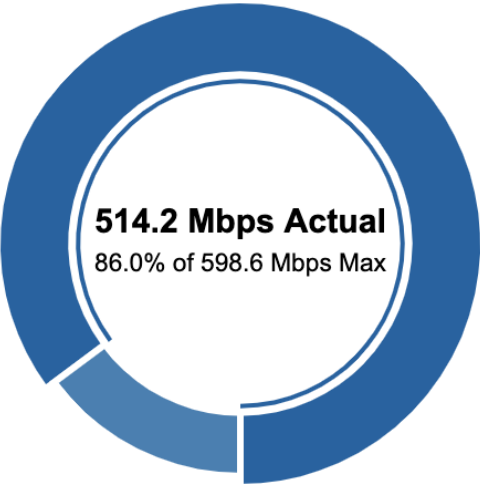


Home Topology

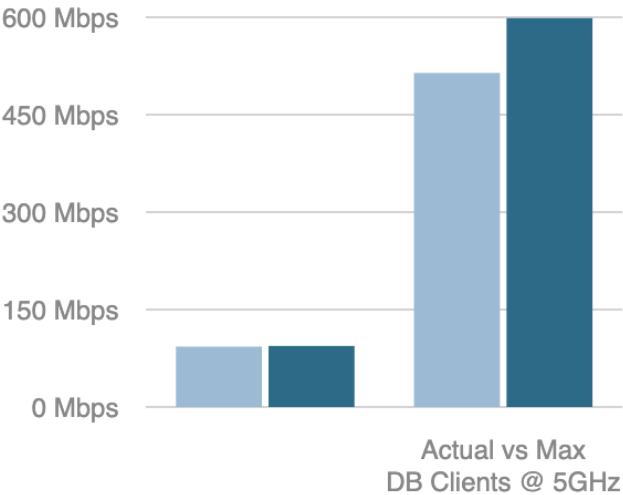
Reset Layout



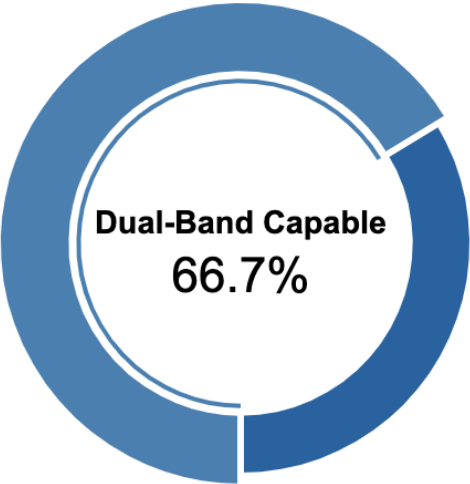
Client Coverage Efficiency 



Dual-Band Client Performance 



Client Dual-Band Capability 

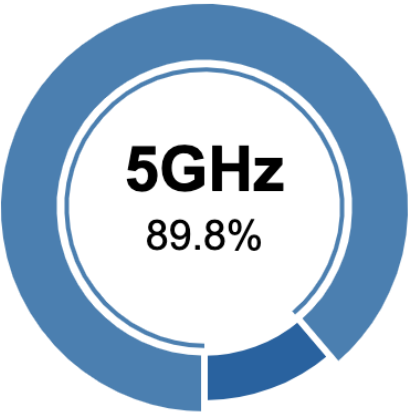




Data Usage per Client 



Steering Performance 

SB Client Uptime	626 Hours
DB Client Uptime	2366 Hours
@ 5GHz	2125 Hours
@ 2.4GHz	241 Hours
Total Duration	2992 Hours
Average Weekly Connection Time	
Single Band Clients	63 Hours
Dual-Band Clients	118 Hours



 Steering Actions	
2.4GHz → 5GHz	0
5GHz → 5GHz	0
2.4GHz → 2.4GHz	0
5GHz → 2.4GHz	0
Total steers	0



	Friendly Name	Vendor	MAC Address	LAN IP	Capabilities	Max Phyrate	AP Connected	Estimated Throughput	Data Usage
➤	Philipsone6Plus	Apple	1c9148b9925f	192.168.1.139	2x2 AC Dual	867 Mbps	8841fc94ec71	227.90 Mbps	37.75 GB
➤	MartinsiPhoneX	Apple	4098ad2992af	192.168.1.183	2x2 AC Dual	433 Mbps	8841fc4de220	181.81 Mbps	29.14 GB
➤	Dagligstue	Apple	dc56e7468837	192.168.1.170	2x2 AC Dual	867 Mbps	8841fc4de220	221.27 Mbps	7.09 GB
➤	Chromecast-Ultra	Google	5460094f9320	192.168.1.134	2x2 AC Dual	867 Mbps	8841fc4de220	226.71 Mbps	6.84 GB
➤	Martins-MBP	Apple	784f4381bb02	192.168.1.113	3x3 AC Dual	1300 Mbps	8841fc4de220	262.50 Mbps	6.51 GB
➤	Stinasione8Plus	Apple	4098ad03ce76	192.168.1.124	2x2 AC Dual	867 Mbps	8841fc94c999	218.85 Mbps	5.82 GB
➤	StinaiPadkkken	Apple	54ae2722300d	192.168.1.108	2x2 N Dual	300 Mbps	8841fc94ec71	139.94 Mbps	5.61 GB
➤	Stinas-Air	Apple	5cf93889aba0	192.168.1.103	2x2 AC Dual	867 Mbps	8841fc4de220	229.06 Mbps	5.20 GB
➤	FrederisiPadAir	Apple	34ab37928a46	192.168.1.109	2x2 AC Dual	867 Mbps	8841fc94ec71	228.99 Mbps	2.96 GB
➤	MartinspleWatch	Apple	f86fc1a4bc68	192.168.1.181	1x1 N 20MHz 2.4 GHz	72 Mbps	8841fc4de220	54.33 Mbps	1.81 GB
➤	amazon-d95ba07f2	Amazon	40b4cdbb21d2	192.168.1.238	1x1 N 20MHz 2.4 GHz	72 Mbps	8841fc94bdf1	53.99 Mbps	1.57 GB
➤	192.168.1.98	Amazon	34d27019fb2d	eth0.1	2x2 N Dual	300 Mbps	8841fc94ec71	139.77 Mbps	1.44 GB
➤	StinasApleWatch	Apple	347c25e413d4	192.168.1.215	1x1 N 20MHz 2.4 GHz	72 Mbps	8841fc94c999	54.06 Mbps	868.81 MB
➤	Google-Home-Mini	undefined	44070bbe2ba2	192.168.1.78	1x1 AC Dual	433 Mbps	8841fc4de220	206.12 Mbps	732.26 MB
➤	Google-Home	Google	20dfb98123ae	192.168.1.152	1x1 AC Dual	433 Mbps	8841fc94ec71	196.80 Mbps	731.26 MB
➤	HarmonyHub	Slim	000420e8a468	192.168.1.89	1x1 N 2.4 GHz	150 Mbps	8841fc94c999	59.58 Mbps	680.60 MB
➤	Argon	Frontier	0022611a77b4		1x1 N 20MHz Dual	72 Mbps	8841fc94c999	56.76 Mbps	669.59 MB

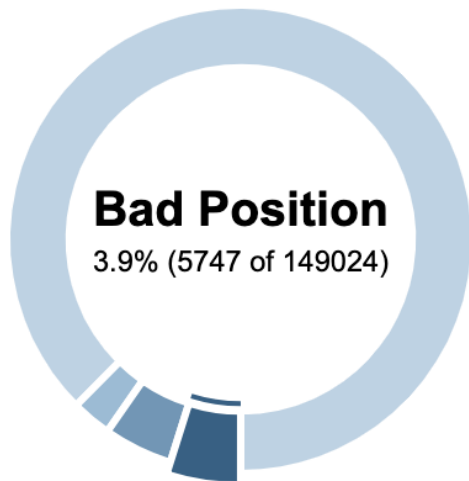


Installation Health

Client Warnings

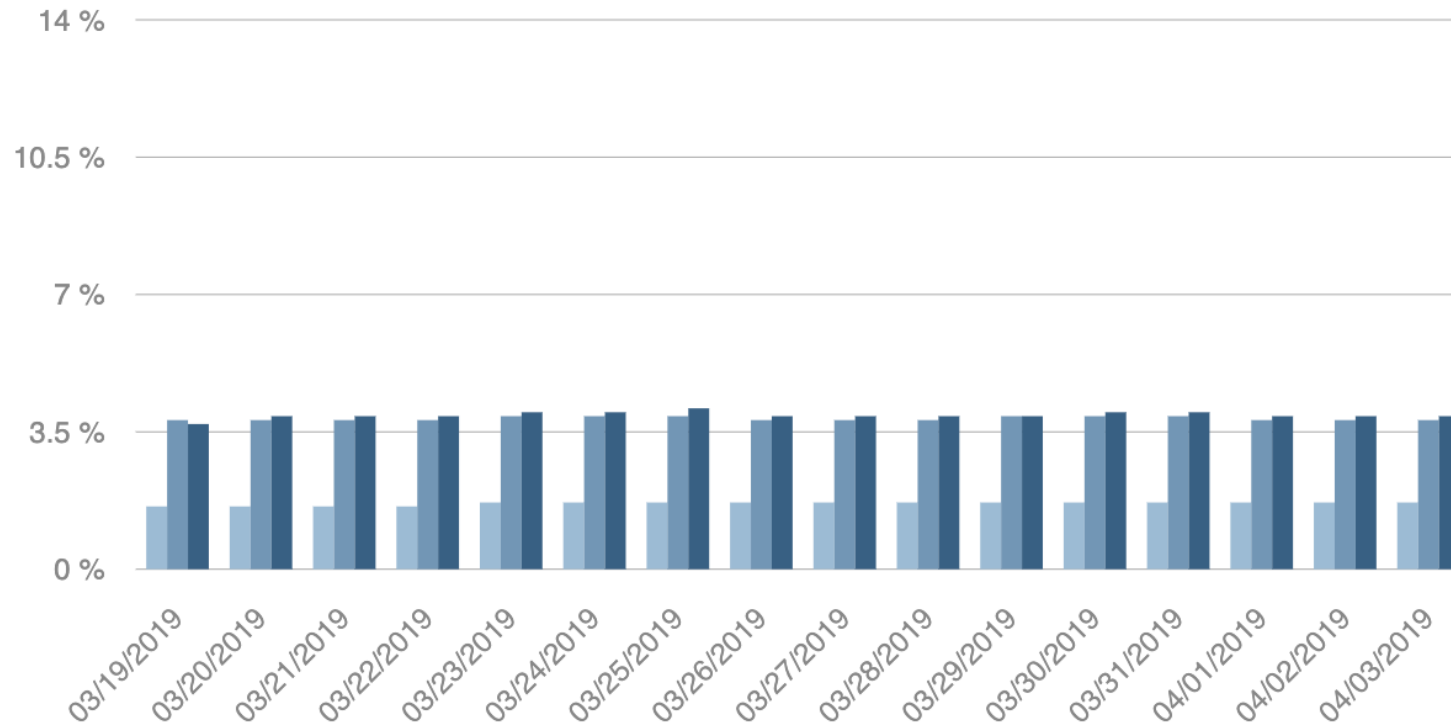
DFS

Installation Alarms



Report Date: 04/03/2019 

■ Healthy Nodes
 ■ Too Close
 ■ Weak Position
 ■ Bad Position





Please Select an Item

- Wi-Fi Performance Reports
- Airtime Analysis Reports

Homes that need Broadband Upgrade

Homes with Coverage Problems

Homes that need wireless device upgrade

Homes that have coverage problems and need extenders

Generic Consolidated Dashboard
- Channel Reports
- Device-Hardware Reports
- Client Reports
- Installation Reports
- Top 100 Device Lists
- Reboot Analysis Reports

Channel Change Reports for 5GHz

Channel Change Reports for 2.4GHz

5GHz Airtime Analysis Reports

2.4GHz Airtime Analysis Reports

Client RSSI Report

Legacy Client Connected Devices

Description

Related report contains all homes that need wireless network upgrade according to wireless client's coverage problems. Home details contains domain-id, wan-ip, ethernet-mac, serial and percentage of coverage problem.

Start Date

Select Date...

End Date

Select Date...

FILE-LIST

SMART WIFI - RESULTS

Success

- More than **95%** of the WiFi units are used.
- Our competitors copied our concept.
- And the products are now being sold in retail.

NPS

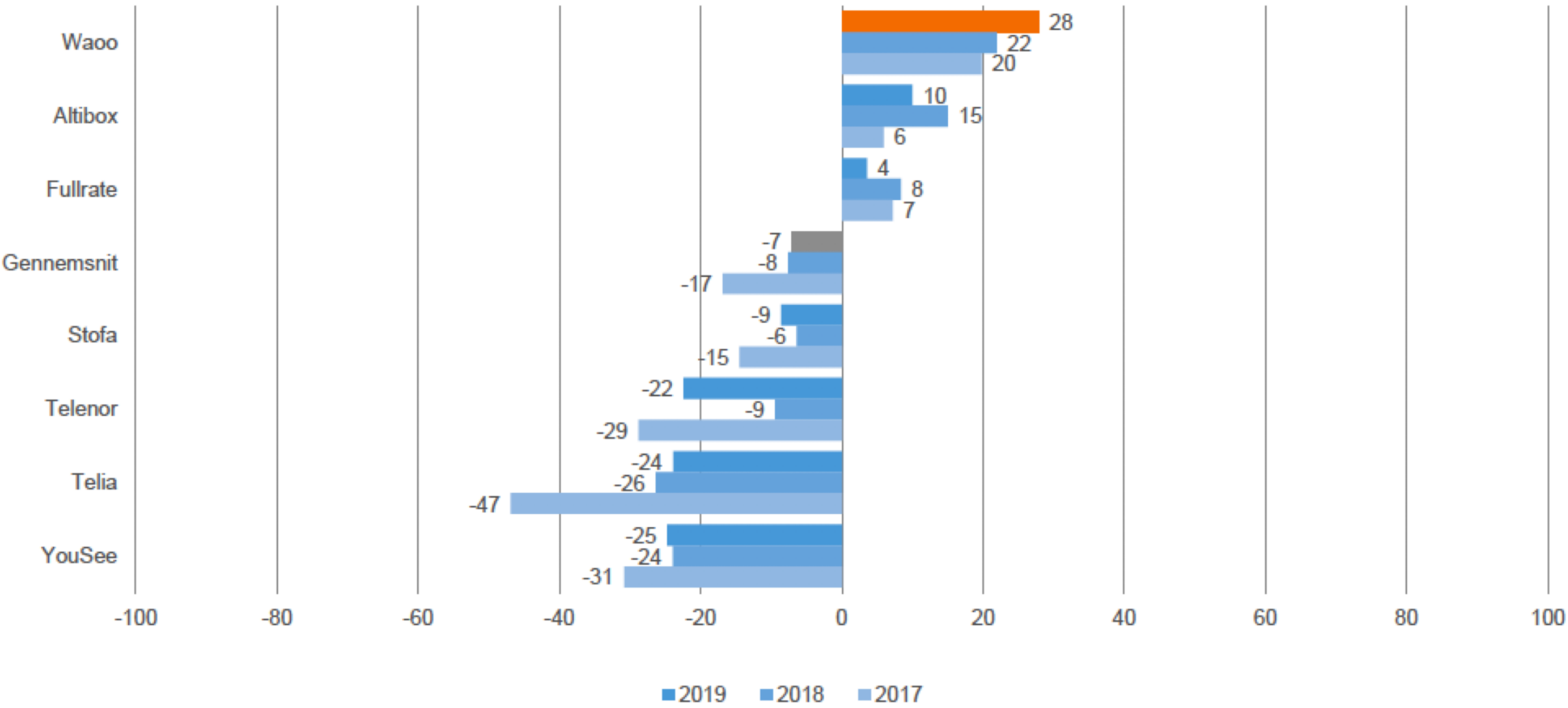
- Net Promotor Score from **20 to 28**

Awards

- Won the Wi-Fi Now 2016 award for Best In Home WiFi Product



Net Promoter Score®



SMART WIFI

- Almost 100% increase in two top tiers.
- Before about 20% in top tiers. Now 40%

WAOO FIBER BASIC

- 100/100 Mbit/s
- Wao Standard WiFi
- Sikkerhedspakke

WAOO FIBER EXTRA

- 300/300 Mbit/s
- Wao Smart WiFi
- Sikkerhedspakke
- 25 GB online harddisk
- Wao Udvidet Installation

WAOO FIBER FULL

- 500/500 Mbit/s
- Wao Smart WiFi
- Sikkerhedspakke
- 100 GB online harddisk
- Wao Udvidet Installation
- Altid det nyeste Wao-udstyr



SMART WIFI - LEARNINGS

- Educate customers that WiFi will not provide 100% of their need.
- Better to have full coverage and stable connection vs. max speed.

WAOO

SMART WIFI NEXT GEN.

Next Gen.

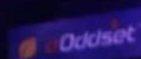
- WiFi 6 (802.11ax) - Higher speeds, better coverage, better battery usage, more clients
- Push notifications to users in App
- Better start-up installations process
- Focus on Gamers (low latency)



ELGIGANTEN



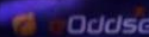
ELGIGANTEN



ELGIGANTEN



ELGIGANTEN



ELGIGANTEN eOddset WAOO ESPORT DANMARK eSport.dk



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WiFi FOR GAMER

Waoos has massive focus on eSports

- Sponsor CS:GO Pro Team **TRICKED**
- Sponsor of FIFA Pro Team **AGF**
- Sponsor of **FIFA LEAGUE** Denmark
- Sponsor of **WAOO CS:GO LEAGUE**



Important factors for gamers

- Low latency and Ping – Ping is king
 - **Latency** is the time it takes for data packets to reach your device from a server.
 - **Ping** is the time it takes a data packet to leave your device, reach a server, and return.
 - Basically, they both measure “lag.”
- Stable connection
- High speed (for downloads)



STREAMING OVER WIFI



High Quality WiFi

- 4K streaming
- Multiple devices

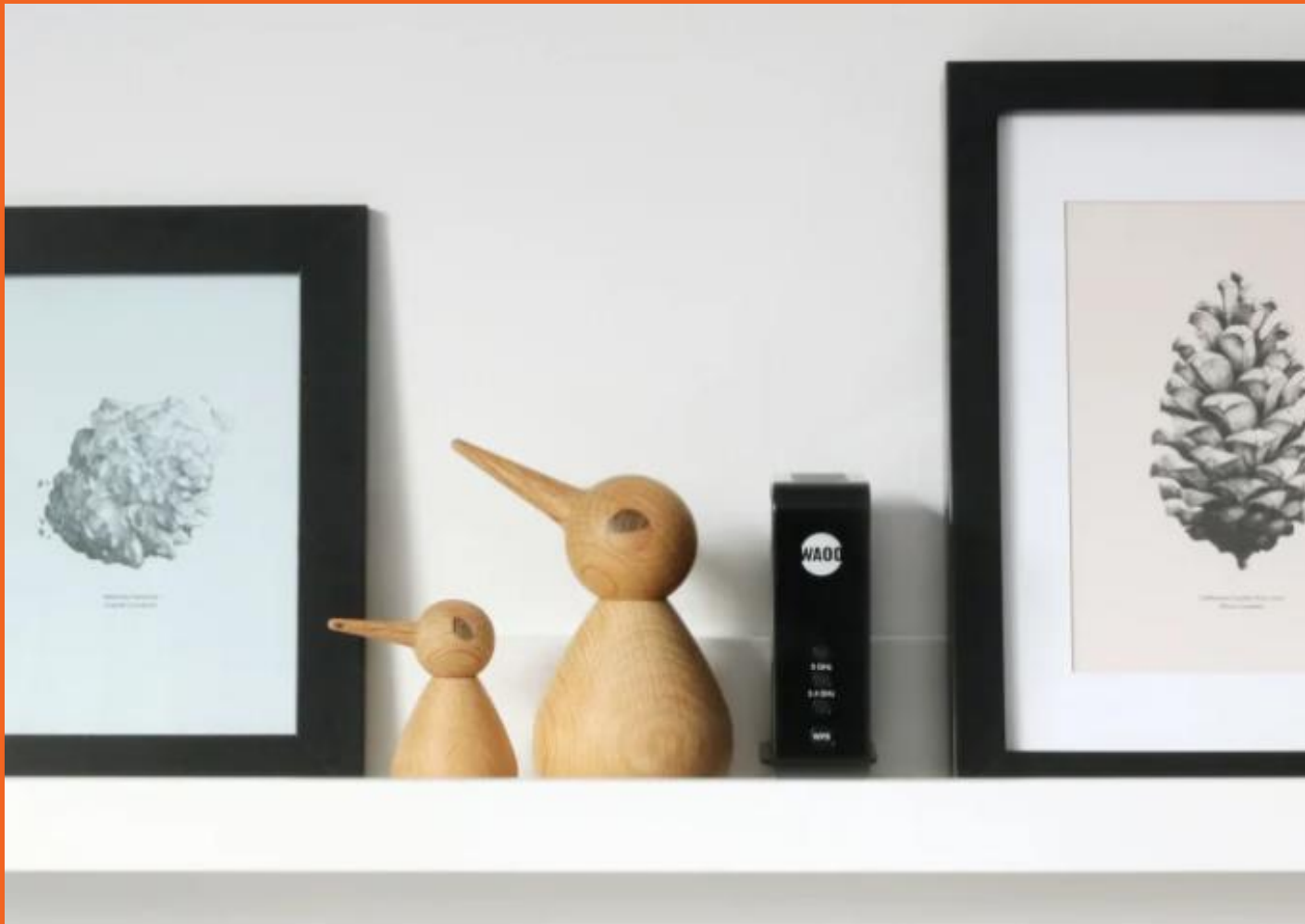








DESIGN





INTERNET AS IT
SHOULD BE