True open access in Denmark
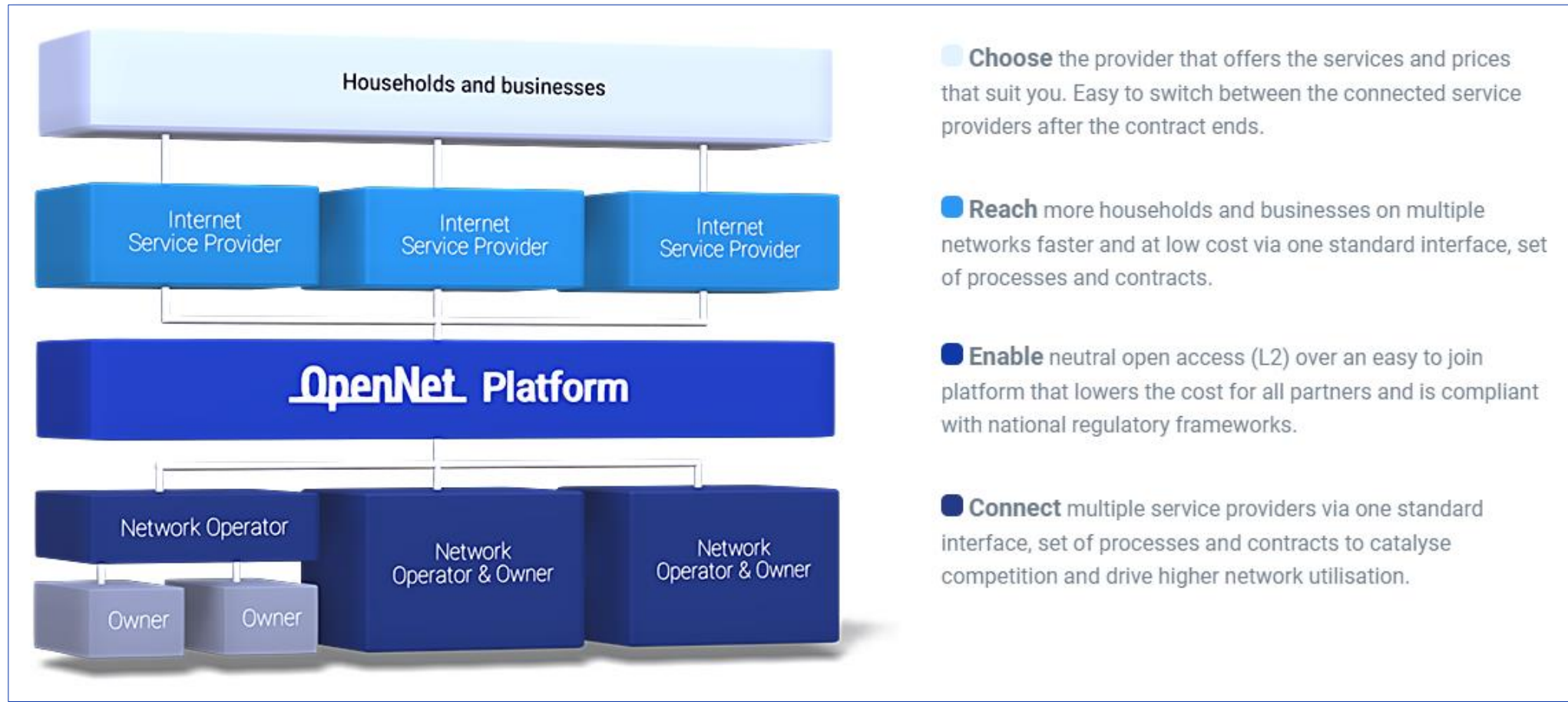## - Creating an open access ecosystem

Kristian O. P. Freiesleben – International Business Director, OpenNet

- Former Director, Wholesale & Product Management, Norlys Fibernet
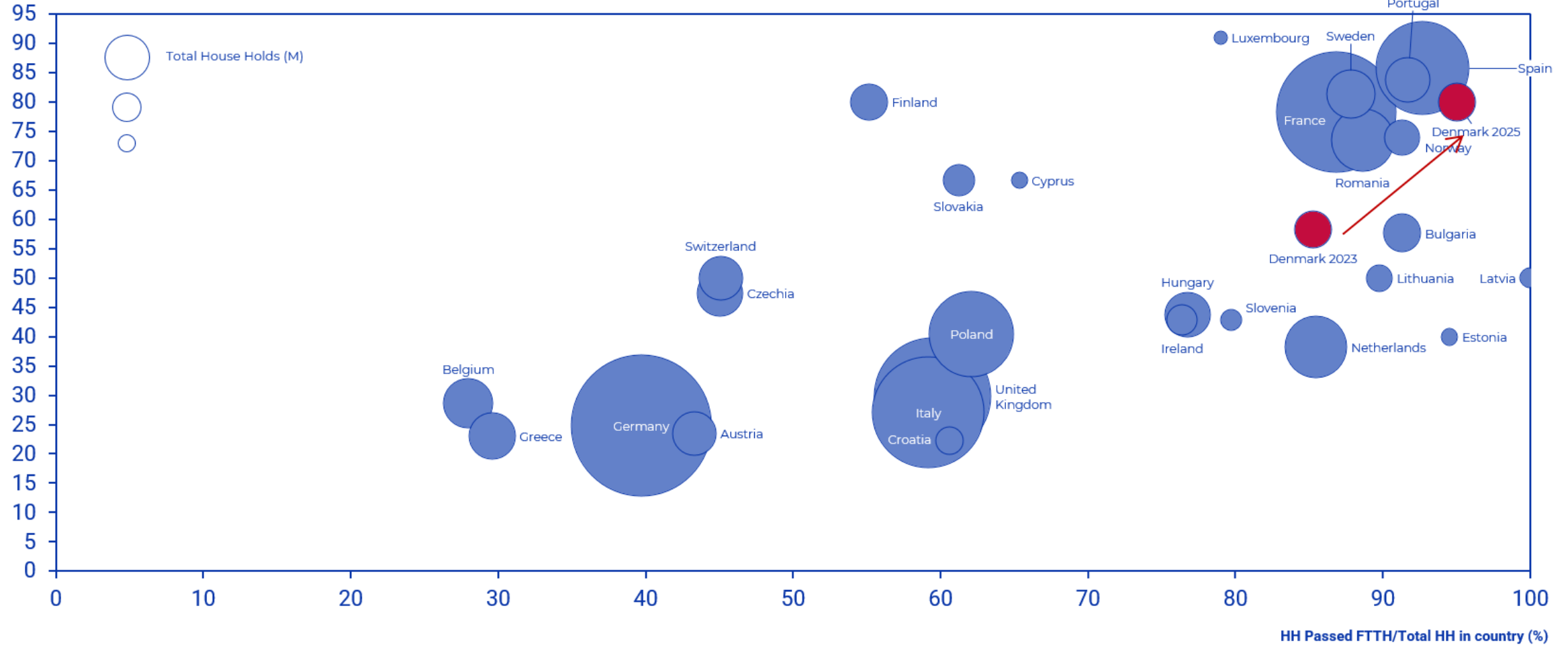- Former Director, Product Management, TDC Network Services

OpenNet

- Wholesale open access fibre transaction platform

- Access for all ISPs to major part of Denmark

- Expanding into rest of EU – Germany in 2024->

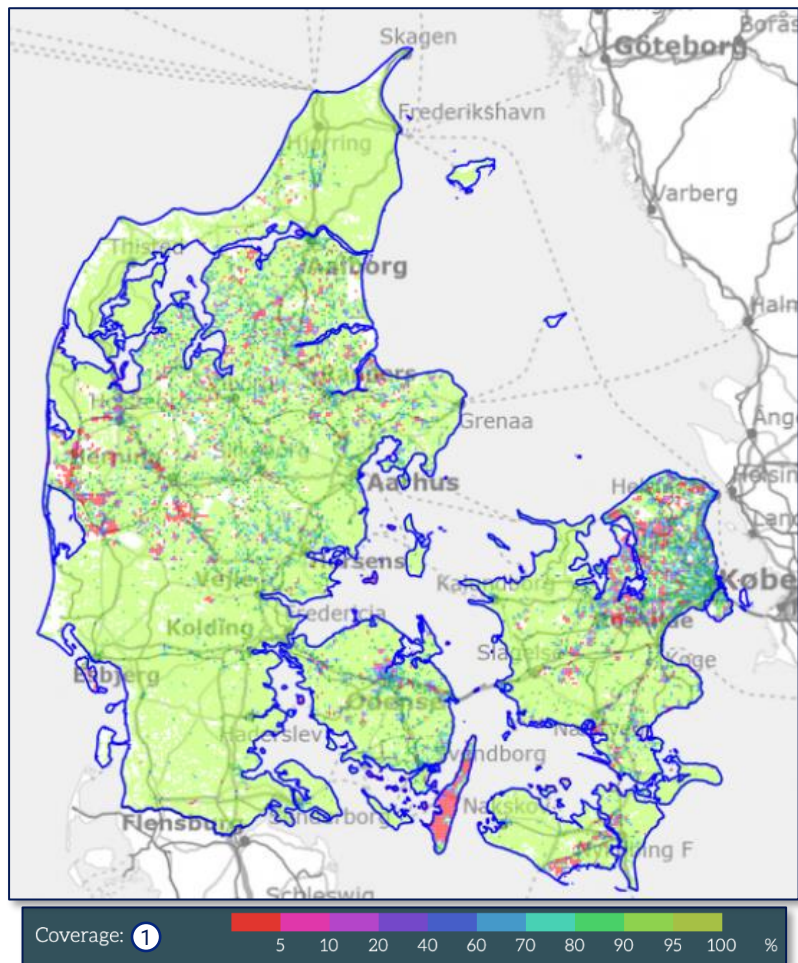- Part of Norlys Group - but operates fully independent and neutral

VATM excursion 2024 Copenhagen -"*True Open Access in Denmark*" *18th of June 2024*

The new open access business model

Households and businesses

Internet Service Provider | Internet Service Provider | Internet Service Provider

OpenNet Platform

Network Operator | Network Operator & Owner | Network Operator & Owner

Owner | Owner

Choose the provider that offers the services and prices that suit you. Easy to switch between the connected service providers after the contract ends.

Reach more households and businesses on multiple networks faster and at low cost via one standard interface, set of processes and contracts.

Enable neutral open access (L2) over an easy to join platform that lowers the cost for all partners and is compliant with national regulatory frameworks.

Connect multiple service providers via one standard interface, set of processes and contracts to catalyse competition and drive higher network utilisation.

In Denmark ~85% of the 2,8M households (Sep 2023) are already passed with fibre

OpenNet

HH Activated FTTH /HP FTTH (%) [1]

Total House Holds (M)

Portugal
Luxembourg
Sweden
Spain
France
Denmark 2025
Norway
Romania
Finland
Cyprus
Slovakia
Bulgaria
Switzerland
Denmark 2023
Czechia
Lithuania
Latvia
Hungary
Slovenia
Poland
Ireland
Netherlands
Estonia
Belgium
United Kingdom
Greece
Germany
Austria
Italy
Croatia

HH Passed FTTH/Total HH in country (%)

Roll out driven by 15+ network owners of which 14 are utility companies

Coverage: ① 5 10 20 40 60 70 80 90 95 100 %

1) Availability across Denmark of 1/1Gbit/s on FttH 2024 (https://tjekditnet.dk/kort)

Danish broadband market

- Fibre-utilities and alt-nets, mainly consumer-owned, have deployed fibre networks since the mid '00s ~80% market share

- TDCnet (incumbent) - fully regulated with open access ~20% market share

- 2017 -> Fibre-utilities give open access based on fair, non-discriminatory and reasonable terms and conditions

- Total investment in FTTH exceeds 4 bn EUR (fibre-utilities only)

- Open access is mainly based on L2 BSA and including all service providers

- BB subscriptions are rapidly moving towards 1 Gbit/s

- Fibre coverage is ~90% - also in rural areas

- Fibre take-up rate is ~56%

Source: The Danish Fibre Alliance - 2024

# The demand for open access platforms is high not only in Denmark

Denmark

- Market leader > 50% share of available footprint for ISPs

- Founded 2017 – high competence level

- Proven and operative – state of the art technology

- Full-service catalogue

- All Danish ISPs active on our platform
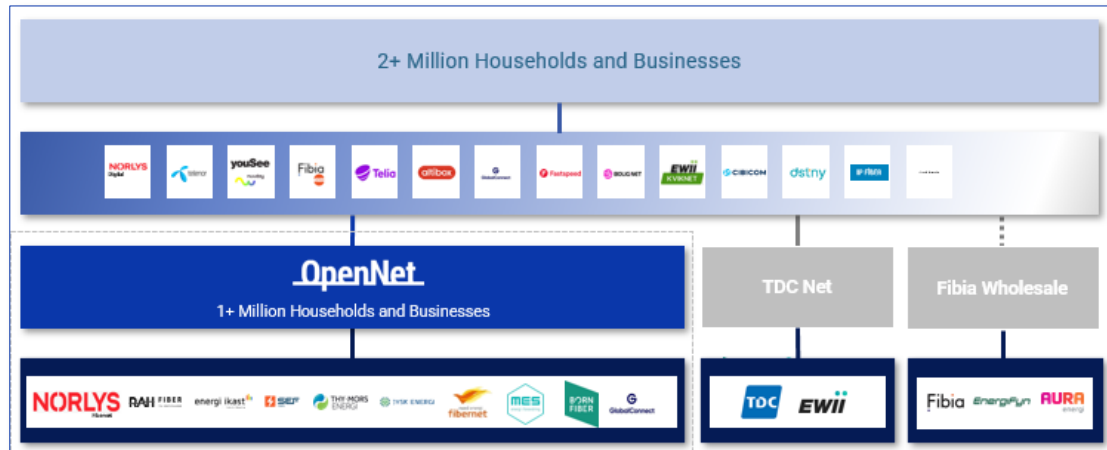
Germany

- Strong partnership Stadtwerke group - Schleswig-Holstein

- Platform active during 2024 – German organisation

- Full-service catalogue

- German-wide offer - Inviting more Network Owners and ISPs

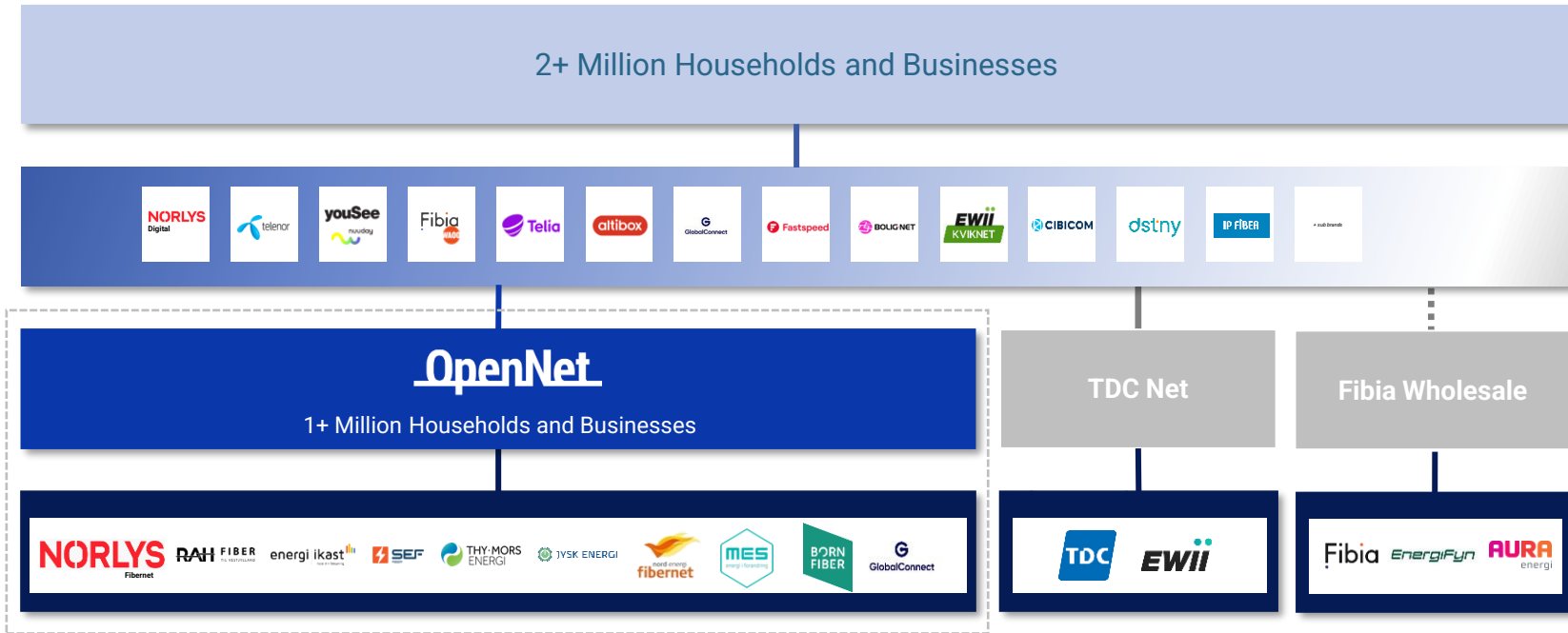- Target >2 Million FTTH addresses - available footprint for ISPs
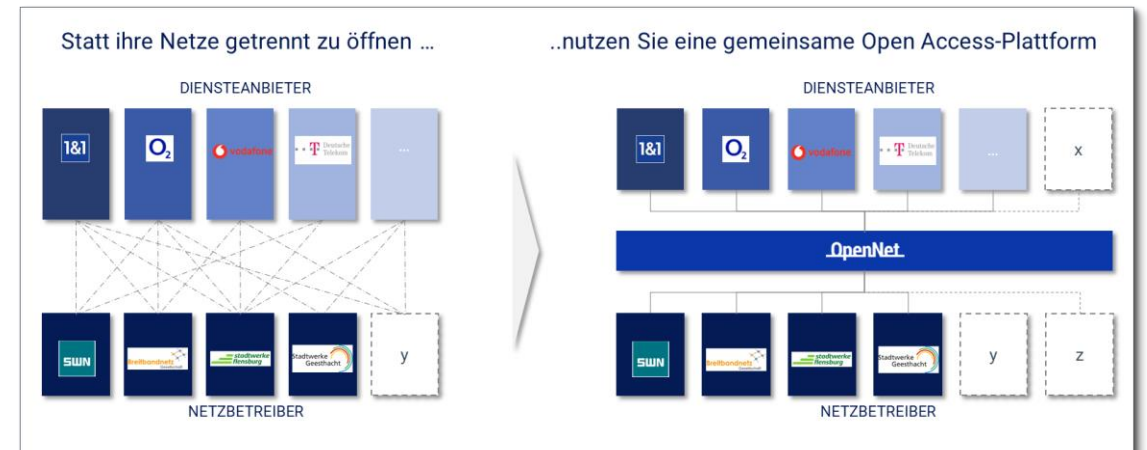
A combined FTTH footprint has attracted all ISPs, made OpenNet the Danish industry standard and fueled utilization and prevented overbuild from TDC / Fibia

End users can choose between more providers with easy switching

15+ ISPs reach 1M+ households on 10 fibre networks through a single interface

OpenNet enables open access through an easy to join & use transaction platform

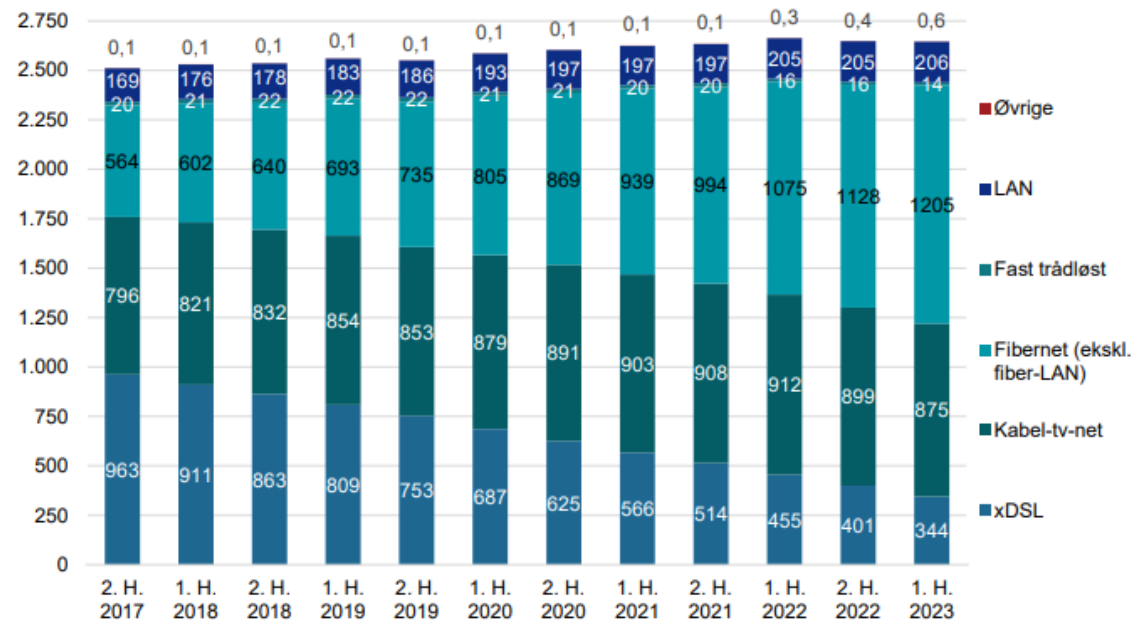**10 Infrastructure owners connect** to 15 service providers to through a single interface.

2+ Million Households and Businesses

OpenNet — 1+ Million Households and Businesses

TDC Net

Fibia Wholesale

Timeline

| Q4 2017 | Q1 2018 | Q2 2018 | Q3 2018 | Q4 2018 | Q1 2019 | Q2 2019 | Q3 2019 | Q4 2019 | Q1 2020 | Q2 2020 | Q3 2020 | Q4 2020 | Q1 2021 | Q2 2021 | Q3 2021 | Q4 2021 | Q1 2022 | Q2 2022 | Q3 2022 | Q4 2022 | Q1 2023 | Q2 2023 |

Latest figure from SDFI (Dänische Agentur für Datenversorgung und Infrastruktur)

Transition to fibre keeps progressing and exceeds 45%

Now 50% at +500 Mbit/s and the final copper squeeze
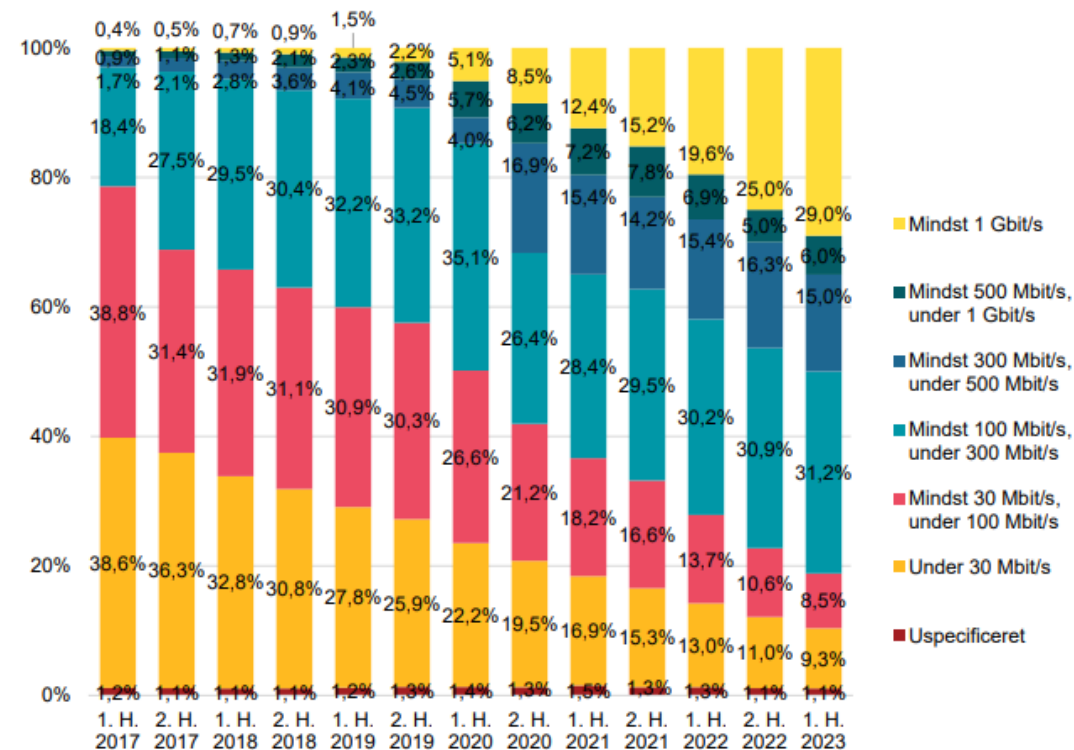
Open access of the fibre network
– considerations of regulation or business development

OpenNet

Regulation
Authorities force an opening of the network

- Others dictate standards and terms for opening the network - Products and Prices

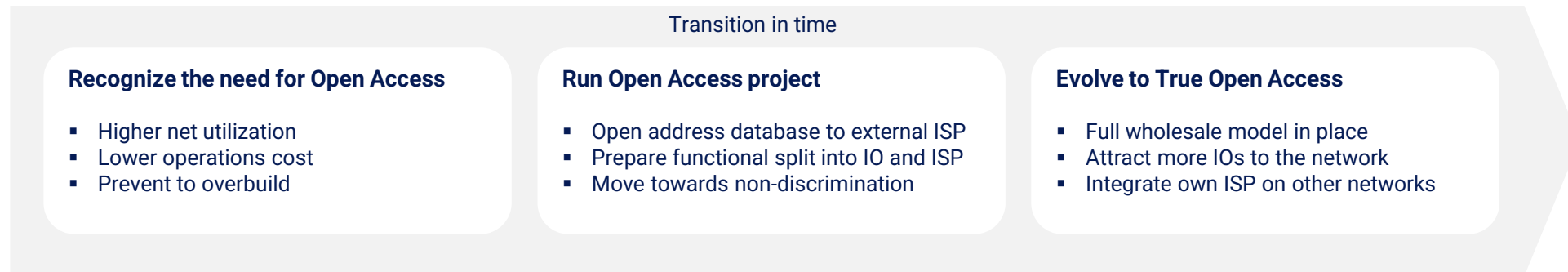**Business Development**
Own SP business is 'weak'

Business Development
Own SP business is 'strong'

- ✓ An attractive business – more customers on the fiber network

- ✓ Proactive opening can set standards for regulation

- ✓ Network Owners are largely 'certified' with the NRAs – when an agreement has been entered into with OpenNet

8

We recognize and support the journey towards TRUE OPEN ACCESS

Open network

Closed network

Fully integrated

Non-discrimination

Transition in time

Recognize the need for Open Access

- Higher net utilization
- Lower operations cost
- Prevent to overbuild

Run Open Access project

- Open address database to external ISP
- Prepare functional split into IO and ISP
- Move towards non-discrimination

Evolve to True Open Access

- Full wholesale model in place
- Attract more IOs to the network
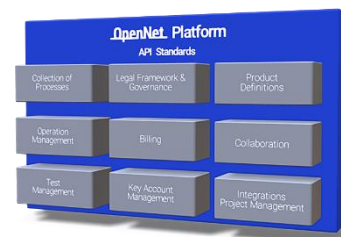- Integrate own ISP on other networks

OpenNet eco-system and a full service catalogue to facilitate collaboration between the Network Owner and the ISP
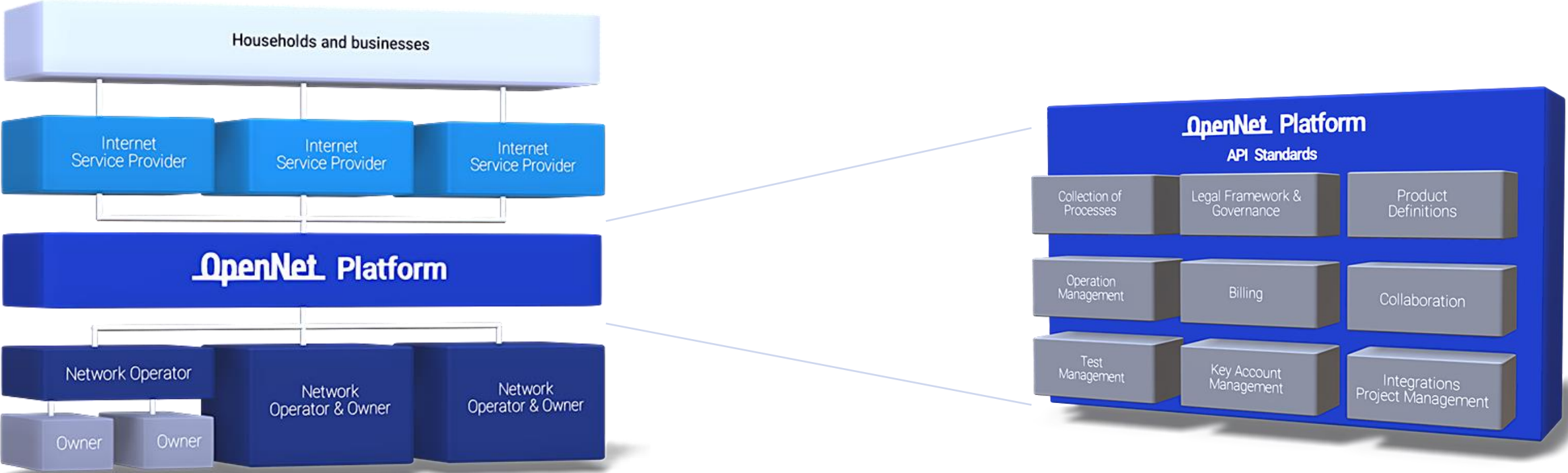
OpenNet offers a set of services beyond the platform to manage the collaboration

OpenNet

OpenNet
Service Catalogue

#	Service	Description
1	Collection of processes	Defines standardized processes of daily operations
2	Product standards	Facilitate a standardized product portfolio
3	Legal framework & governance	Standardizing contracts – Lean negotiation process and frame for compliance with relevant regulation
4	API standards	Provide standardized APIs to limit complexities
5	S.I. as a Service (option)	Aid IOs & SPs in integration by providing consultancy services
6	Service Management	Service managing all relations and contracts with partners
7	Billing	Billing information and ensuring IOs receive payment from SPs
8	Key Account Management	Drive the commercial partnership
9	Collaboration	Create initiatives to manage collaboration at an operational, commercial and strategic level
10	Test Management	Quality assurance in order to save time and money as well as avoid operational disturbances
11	IO & SP Integrations project management	Implement and connect partners to OpenNet platform in an organized, secure and standardized process

OpenNet Platform
API Standards

Collection of Processes	Legal Framework & Governance	Product Definitions
Operation Management	Billing	Collaboration
Test Management	Key Account Management	Integrations Project Management

OpenNet harmonizes fiber product model (Layer 2) making it easy for the ISP to start

OpenNet

Standardized products and specifications

Std. H1 **Consumers and SMB's**
- Fiber BitStreamAccess (Layer 2) capacity product
- IP service distribution, internet, voice, IP TV
- Predefined access speeds and limited extra services

Std. H2 **Large Business, Enterprise, Public, Telco's**
- Fiber BitStreamAccess (Layer 2) capacity product
- Premium service levels
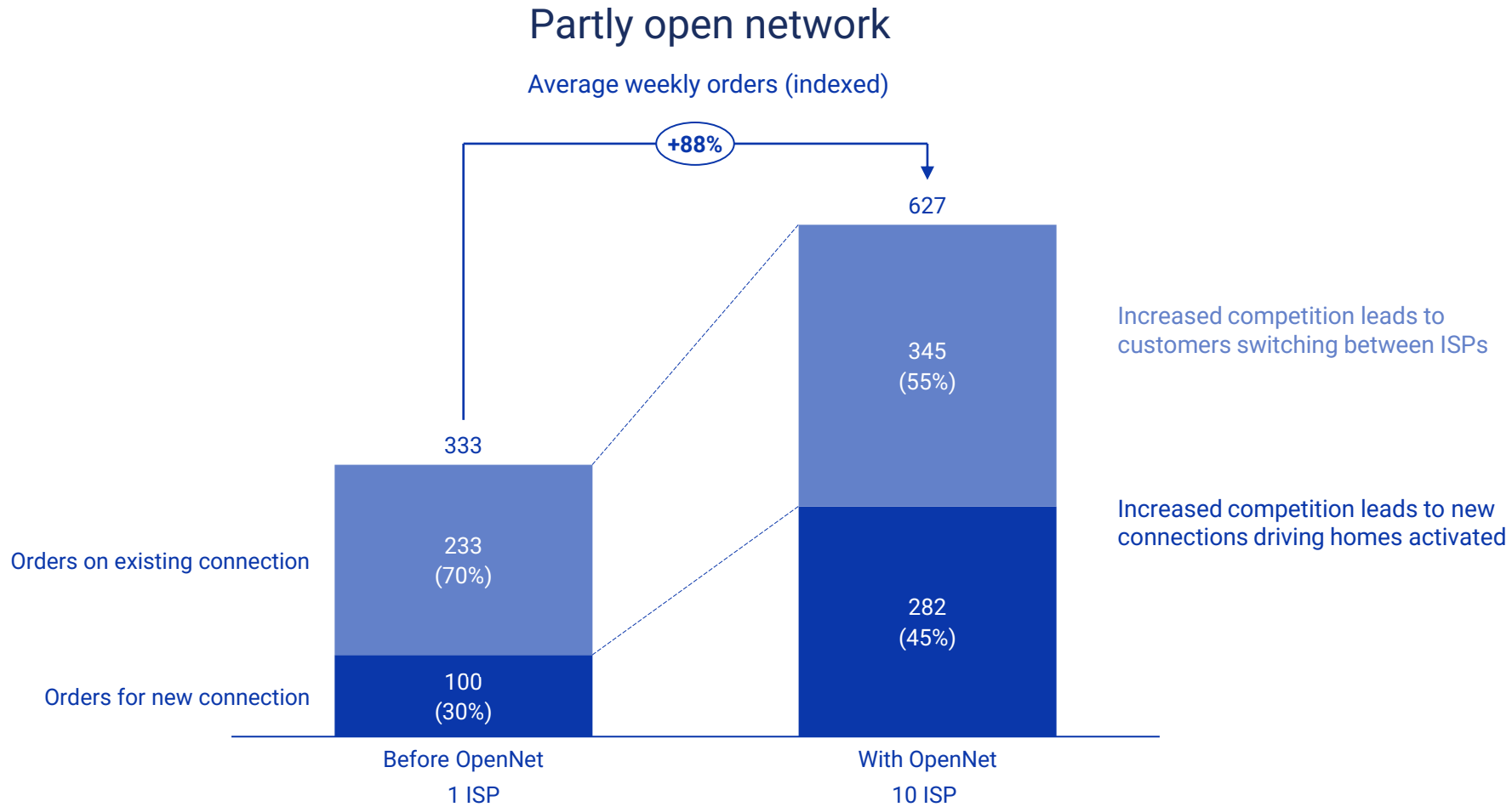- Full extra services (redundancy, jumbo frames etc.)

Std. PoI **Point of Interconnect**
- Hub for Infrastructure owners and Service Providers Network.
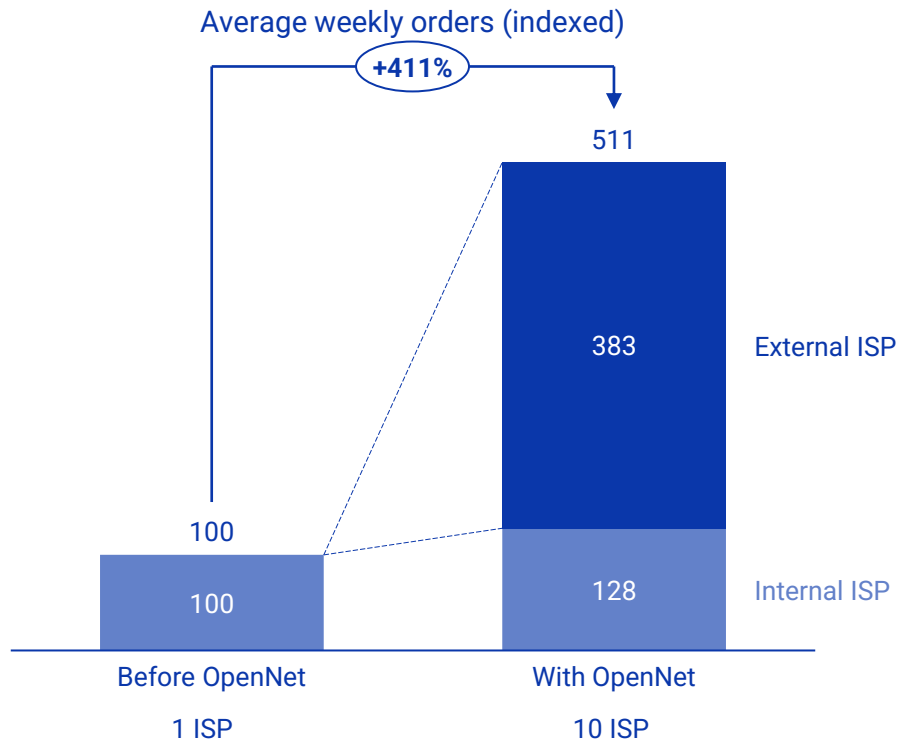- Infrastructure owner typically offers 2 - 4 interconnection points.
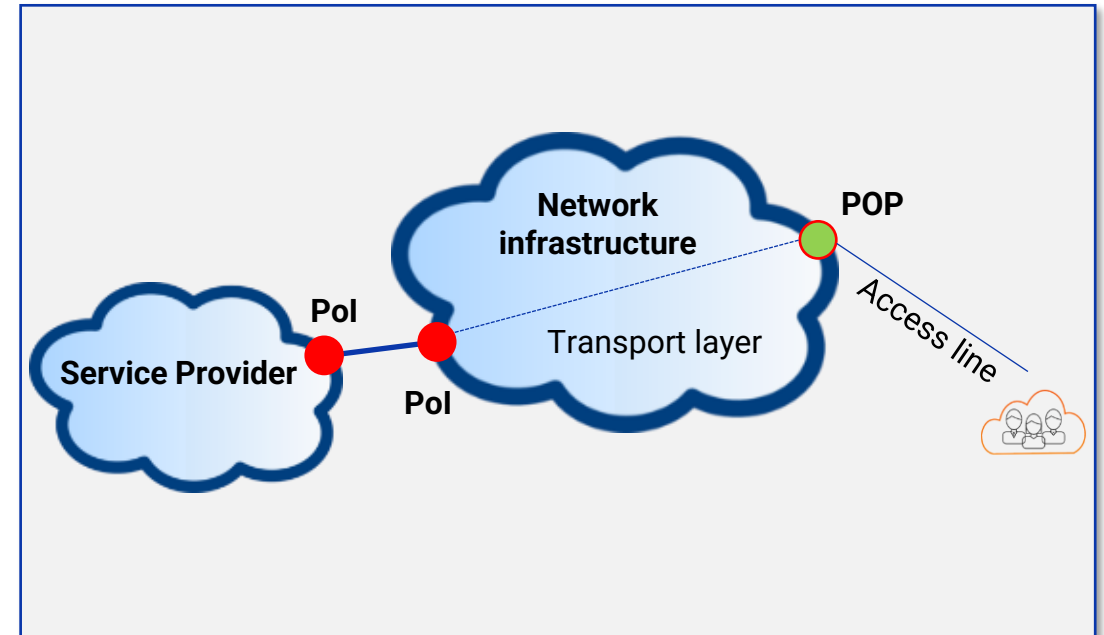
Connecting more ISPs drives competition and network utilization
Anonymized IO case: orders for new connections more than doubled when more ISPs were activated on the network

OpenNet

Partly open network

Average weekly orders (indexed)

+88%

627

345
(55%)

Increased competition leads to customers switching between ISPs

333

233
(70%)

Orders on existing connection

282
(45%)

Increased competition leads to new connections driving homes activated

100
(30%)

Orders for new connection
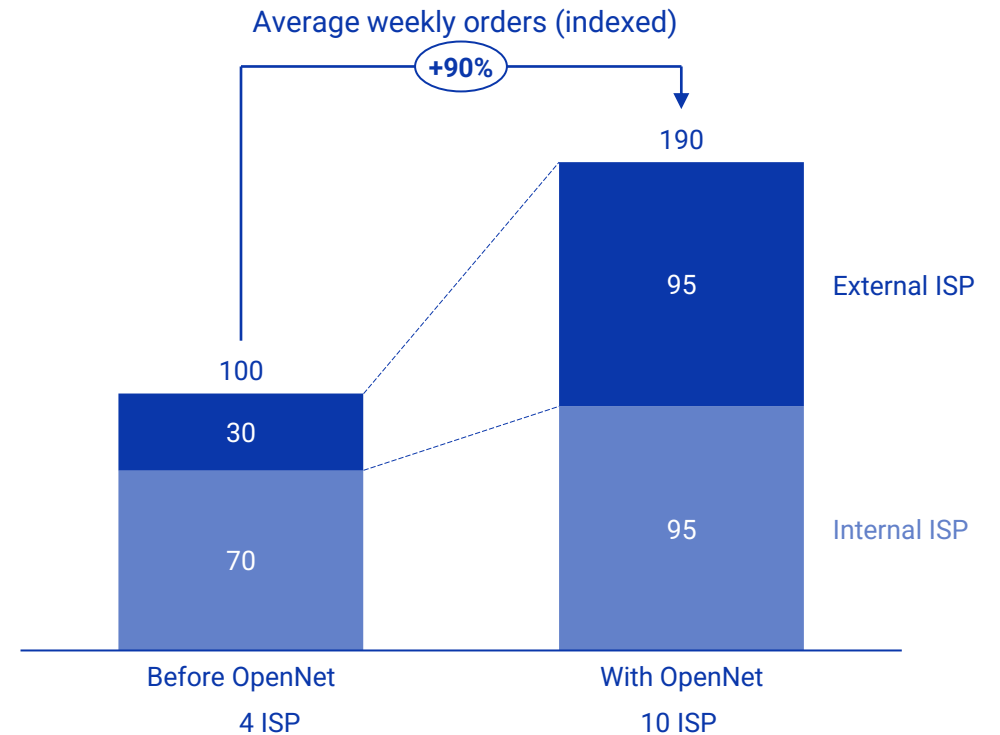
Before OpenNet
1 ISP

With OpenNet
10 ISP

Creating a fully opened network increases sales for closed and partly open networks

Internal ISP also benefits by increasing its gross sales (churn will also grow due to more intensive competition)

OpenNet

Closed network

Average weekly orders (indexed)

+411%

	Before OpenNet	With OpenNet
External ISP		383
Internal ISP	100	128
Total	100	511

Before OpenNet
1 ISP

With OpenNet
10 ISP

Partly open network

Average weekly orders (indexed)

+90%

|	Before OpenNet	With OpenNet
External ISP	30	95
Internal ISP	70	95
Total	100	190

Before OpenNet
4 ISP

With OpenNet
10 ISP

Infrastructure owners have one or more reasons to join OpenNet to open their networks **OpenNet**

The ways to success in the Danish market

I. Setup as a non-discriminatory collaboration platform from the start

II. Harmonized fiber product model (Layer 2) lowering the complexity for ISPs

III. Standardization at its core to lower the complexity and cost of collaboration

IV. Implementation support for ISPs to make it easy to join

Why should you join the OpenNet platform?

✓ Proven platform without big upfront investments

✓ Stay in control over your own wholesale business (contracts, pricing, operations)

✓ Attractive Pay-as-you-grow economy suited for the individual growth

✓ Connect ISPs faster to drive network utilization and prevent overbuild

✓ Consolidate networks over time into a single open access platform
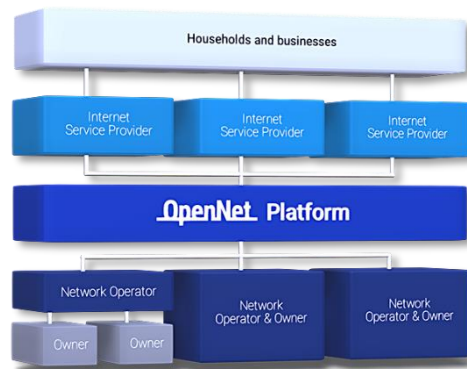
OpenNet

Thank you for listening!

Contact

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