Ασύρματη Καλωδίωση, Πιστοποίηση Υποδομών και Σχεδίαση WiFi

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Enabling Strategies for Business

Η σύγχρονη και ρεαλιστική προσέγγιση στη μελέτη και το σχεδιασμό συστημάτων

Πόσο WiFi ?
Πόσο Fiber ?
Πόσο χαλκός ?
Πόσοι και τι είδους χρήστες ?
Που, πως και πόσο ?
Η διαφορά μεταξύ προτύπων καλωδίωσης και WiFi

Smart Choices

Ή αλλιώς : Ακούγοντας το χρήστη

Η αλήθεια εντός του κτιρίου

- 2015 - More mobile traffic offloaded to WiFi than remained on cellular network

- Within 5 years the average smart phone consumption will increase 5x to 4.4GB/month

- 2016 51% (3.9 exabytes/month) was offloaded

- 2020 55% (38.1 exabytes/month) will be offloaded

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The 802.11 Standard, the Ethernet Alliance and the ITU inside the building

The Wi-Fi Alliance (WiFi 6 πότε ?)

- Provides a highly-effective collaboration forum
- Promotes growth within the Wi-Fi industry
- Leads industry growth with new technology specifications and programs
- Support industry-agreed standards
- Delivers great product connectivity through testing and certification
- Helps to ensure interoperability across wireless vendors

Vendors

Δεν είναι όλοι ίδιοι .

Πρότυπα … CAT6A ? CAT7A ?	Controllers ?	GPON ?
Band Steering ?	PoE ?	Private WiFi ?
2,5 – 5 Gbps ?	MPTL ?	ISO 14763 – TIA testing ?

Το ασύρματο περιβάλλον

Wi-Fi traffic/noise

Non-Wi-Fi traffic/noise

# Η αμίλητη πλευρά του χρήστη …

το MAC Book και ο … ξενοδόχος

Βάζω ή σχεδιάζω WiFi ?

Airtime Utilization
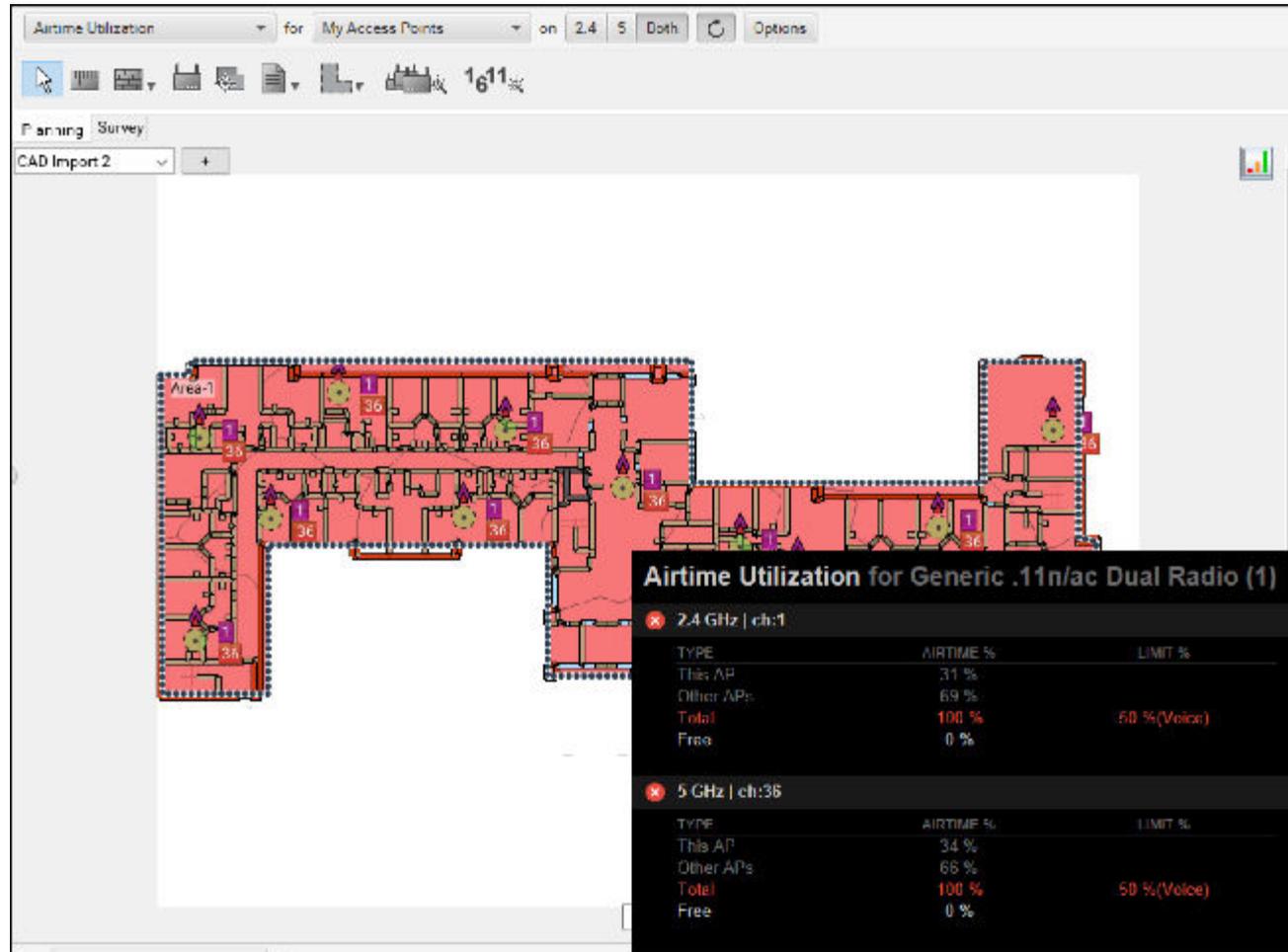
Throughput
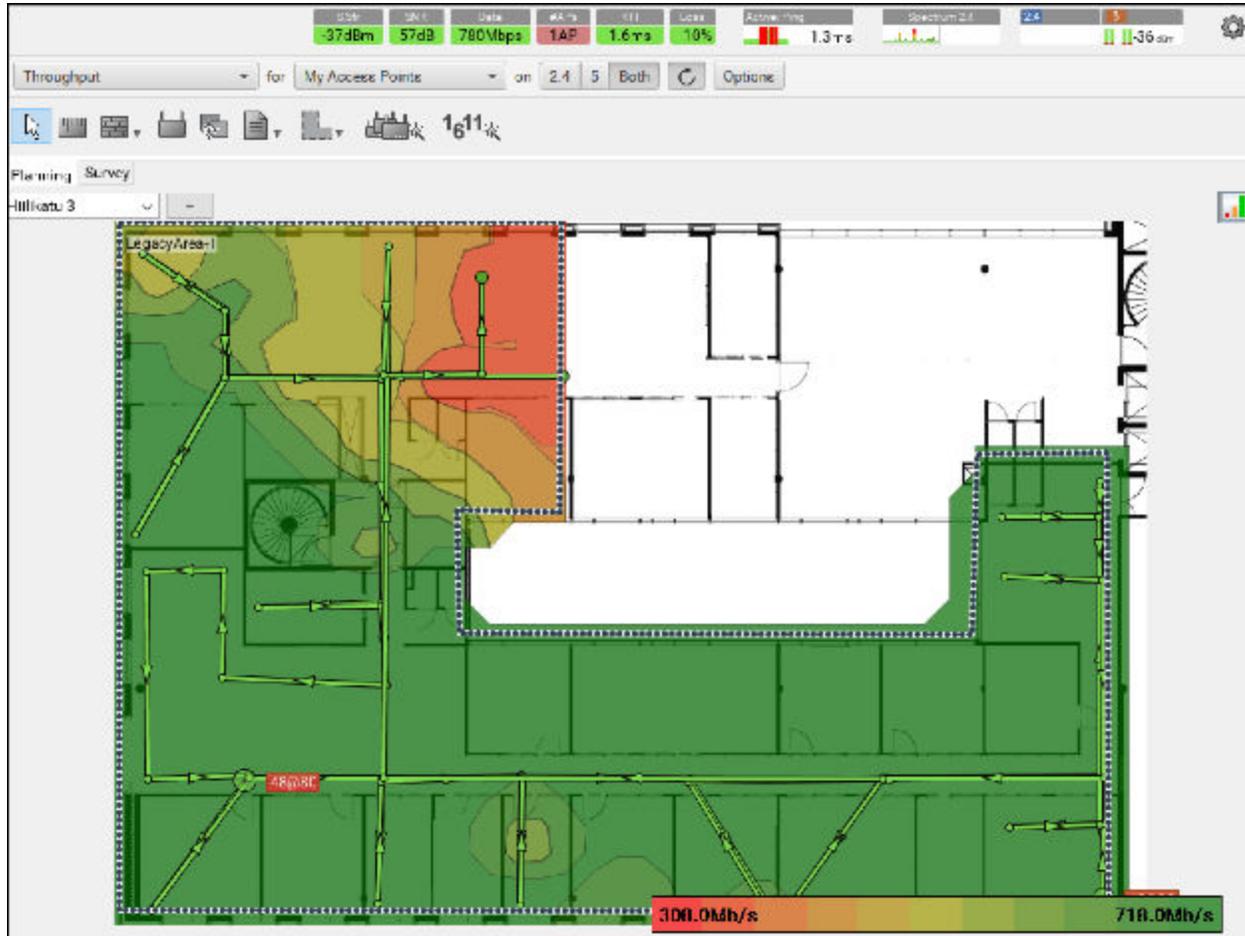
The Ekahau Solution

3D Wi-Fi Planning

    Automatic Wall Detection

    Capacity Planning & Analysis

Site Surveys

    Passive, Active

    Throughput, Spectrum

Fully customizable Reporting

On-The-Spot Troubleshooting

Ο τρόπος να ελέγξουμε τι βλέπει ο χρήστης

The Ekahau Sidekick™

A wearable Survey and Troubleshooting tool

   Works with Ekahau Site Survey

   Integrated Enterprise quality Wi-Fi radios

   Spectrum Analizer

   USB connectivity

   Self contained battery

The Ekahau Solution
Some Customers & Partners

- 15,000 businesses worldwide, including over 100 of the Fortune 500, use Ekahau site survey and planning solutions
- Our customers include thousands of enterprise network administrators and systems integrators
- Today, there are 1M+ Ekahau users worldwide

CISCO

"Always my planning tools of choice."
– Jim Florwick

aruba
a Hewlett Packard Enterprise company

"Aruba chooses to use Ekahau"
– Michael Tennefoss

Ruckus WIRELESS

"It's AWESOME!"
– Greg Kamer

Extreme networks

"This tool rocks!"
– Will Aguilar

Aerohive NETWORKS

"Our team and customers love Ekahau tools"
– Abby Strong

FORTINET MERU

"The best site survey / planning tool"
– Tom Berry

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Technology Overview

WIRELESS

>10G

Antennas	2009	2013	≈ 2020
	IEEE 802.11n	**IEEE 802.11ac**	**IEEE 802.11ax**
	Access Points Datarate (theoretical maximum)		
1x1	**150 Mbit/s**	**866 Mbit/s**	**≈ 3.4 Gbit/s**
2x2	**300 Mbit/s**	**1.7 Gbit/s**	**≈ 6.8 Gbit/s**
4x4	**450 Mbit/s**	**3.4 Gbit/s**	**≈ 13.6 Gbit/s**
8x8	**600 Mbit/s**	**6.9 Gbit/s**	**≈ 27.6 Gbit/s**
Distance	~ 70 m	~ 35 m	~ 10 - 20 m

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Technology Overview

POE

ENERGIE

x3
Power

	2003	2009	2018	2018
	PoE Typ 1 IEEE 802.3af	**PoE+** Typ 2 IEEE 802.3at	**PoE++** Typ 3 IEEE 802.3bt	**PoE++** Typ 4 IEEE 802.3bt
Output power	15.4W	30W	60W	90W
Used by PD	12.95W	25.50W	51W	71W
Used pairs	2	2	4	4

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Nexans FTTO Concept

Distribution Room | Floor | Office

Traditional Installation

Fibre

Alternative Fibre Installation

45-90 m

10-20 m

FTTO Installation

2-5 m
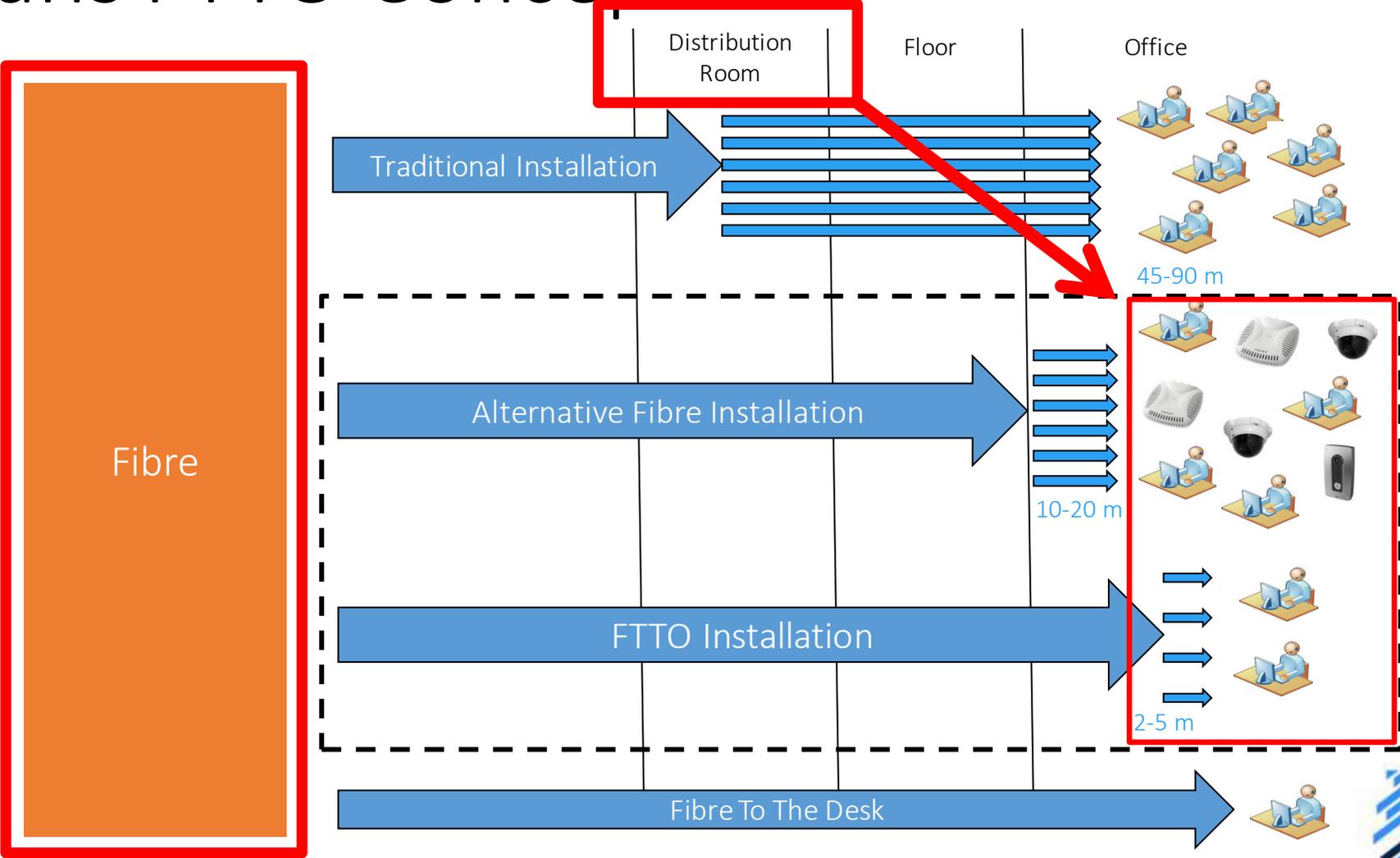
Fibre To The Desk

Nexans FTTO Concept – Digital Ceiling

LANactive Digital Ceiling Switch

LANactive FTTO Switch

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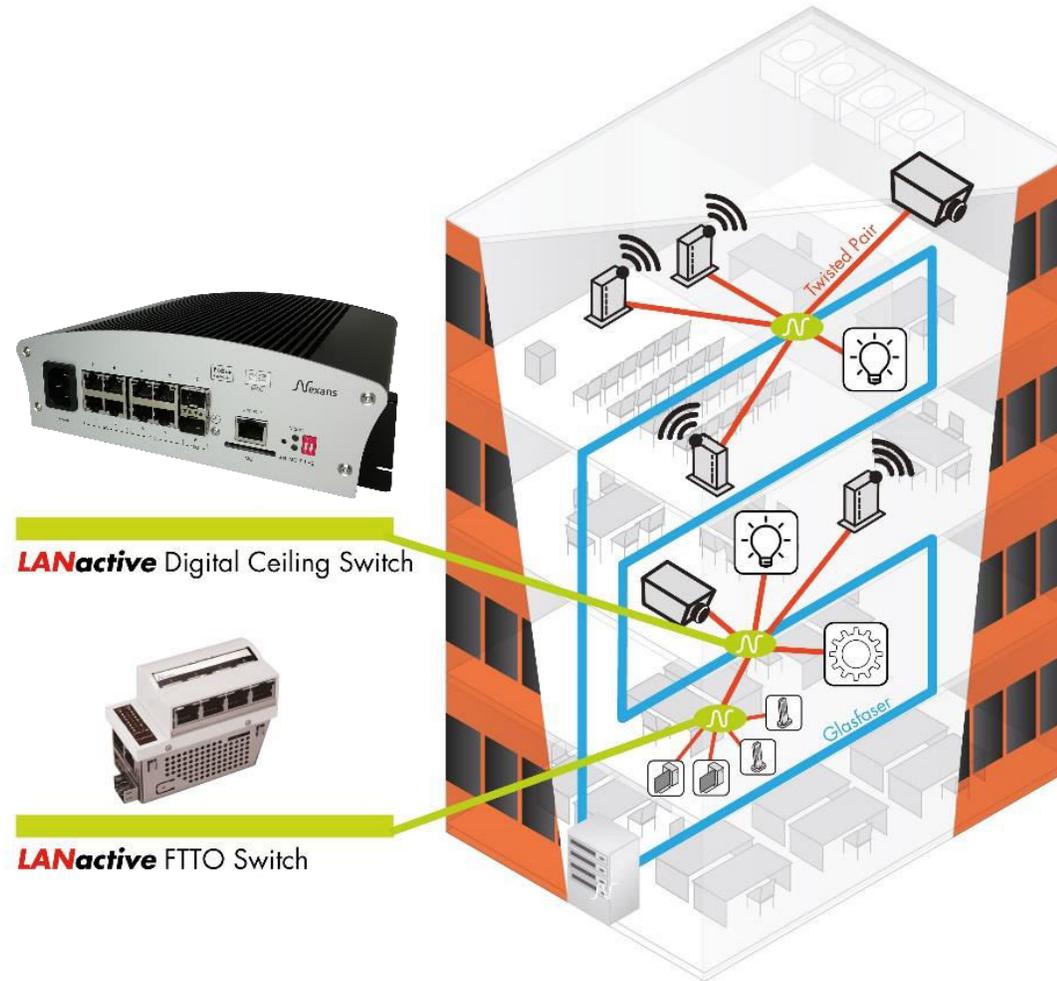
Nexans FTTO Concept

- Traditional Fibre To The Office Installation
- Gigabit bandwidth to the desk
- Power over Ethernet (PoE+) to the IP Phones
- 2-5m copper cable length
- Link Aggregation and redundancy protocols
- Access Network Layer
- Zero-Touch Configuration

Ceiling: 10-20m Cable length

Office: 2-5m Cable length
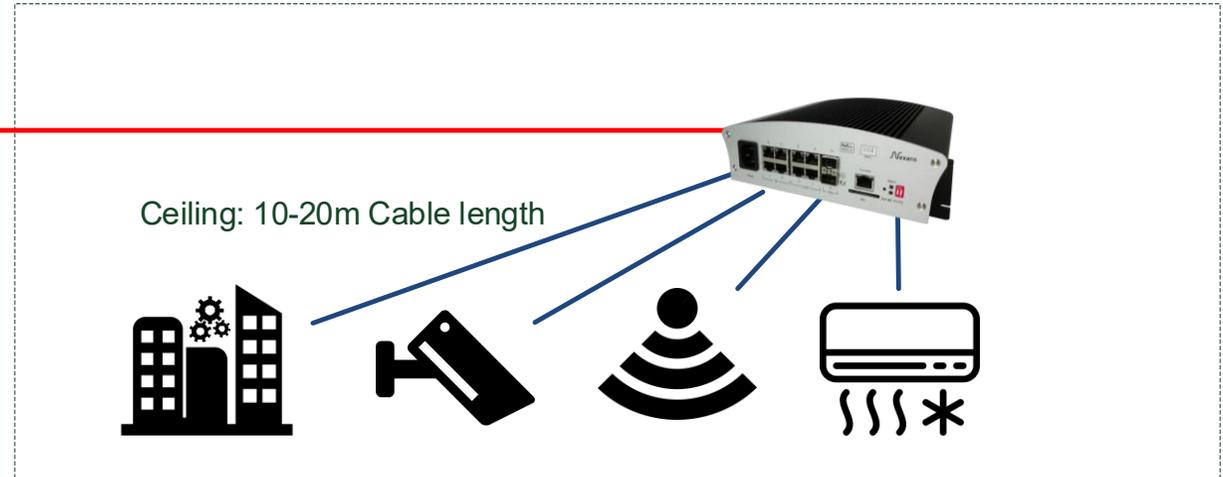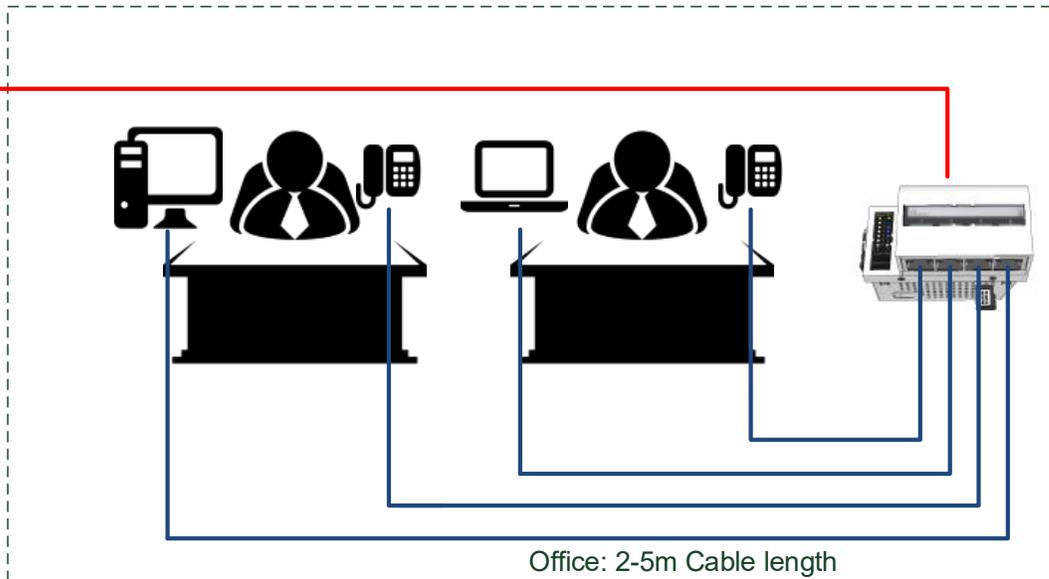
- Fibre in the Digital Ceiling
- More IP equipment in the ceiling (e.g. WLAN APs, IP Cameras, Connected Lighting, Smart Building Systems, etc.)
- More than 4 access ports required
- MultiGigabit ports to the WLAN APs
- Higher density of WLAN APs, cells with a radius of 10…20m
- Power over Ethernet with more than 30W (PoE++)
- Link Aggregation and redundancy protocols
- Smart Ceiling Installation
- Access/Distribution Network Layer

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XGigaSwitch 8TP 2SFP+ AC/DC

- Layer3 Ethernet Switch with Zero-Touch Configuration

- Fan less design

- 2x 10Gbps Uplink (SFP+)

- 4x 2.5Gbps + 4x 1Gbps Access Ports

- 8x PoE++ with 90W (max. 480W)

- Internal/External Power Supply

- Smart Ceiling Installation (tool-less)

- Adaptor for 19" and DIN-Rail available

Furthermore…

- More than coexisting concepts
- Connection of separated working places
- The XGigaSwitch provides data and power to the FTTO Switch
- FTTO Switch forwards the power to the IP Phone
- And … **CABLE STATISTICS**

Ceiling

Office

Power & Data
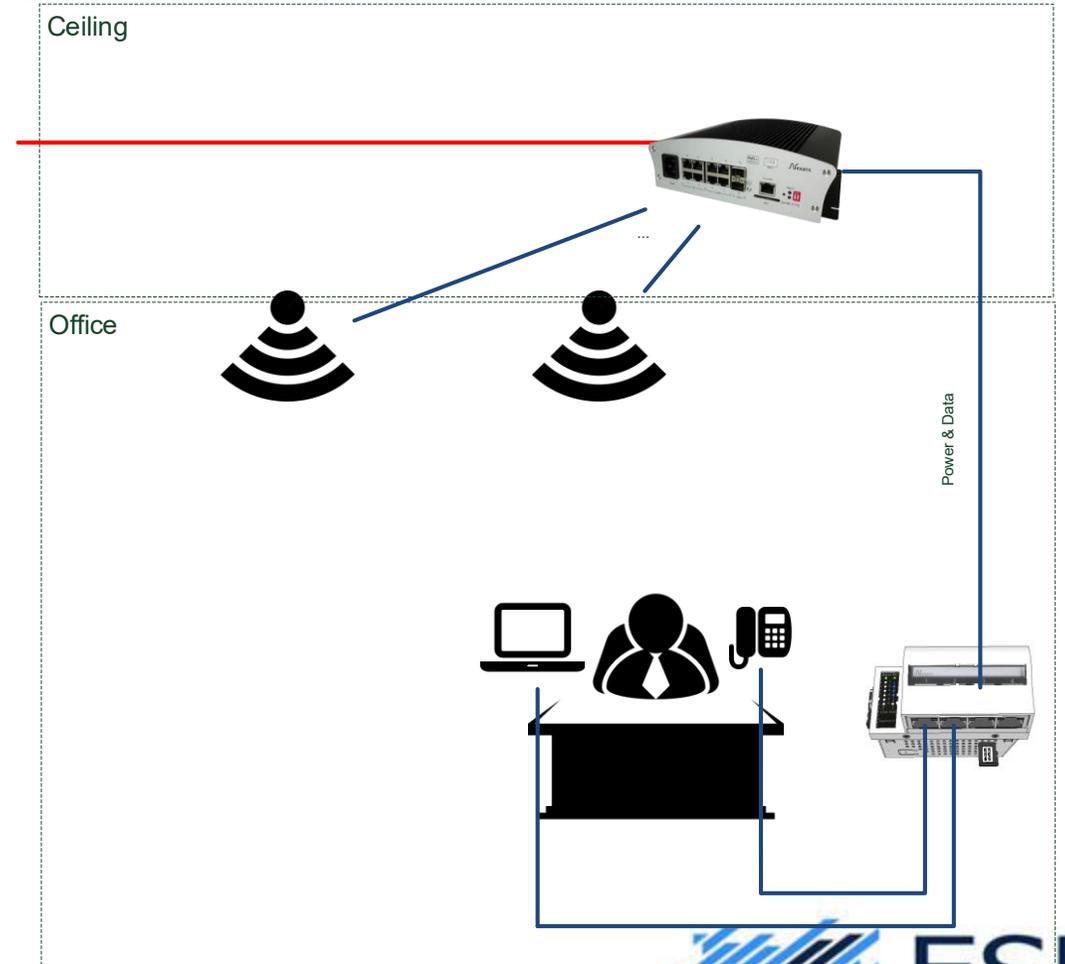
Στα ενδότερα της φυσικής υποδομής ...

Τι πραγματικές δυνατότητες δίνει η φυσική υποδομή στον τελικό χρήστη ...

Τι νόημα έχουν τα 35dB NEXT στα 500 MHz στα υψηλά επίπεδα του OSI ?

Ceiling

Office

Power & Data
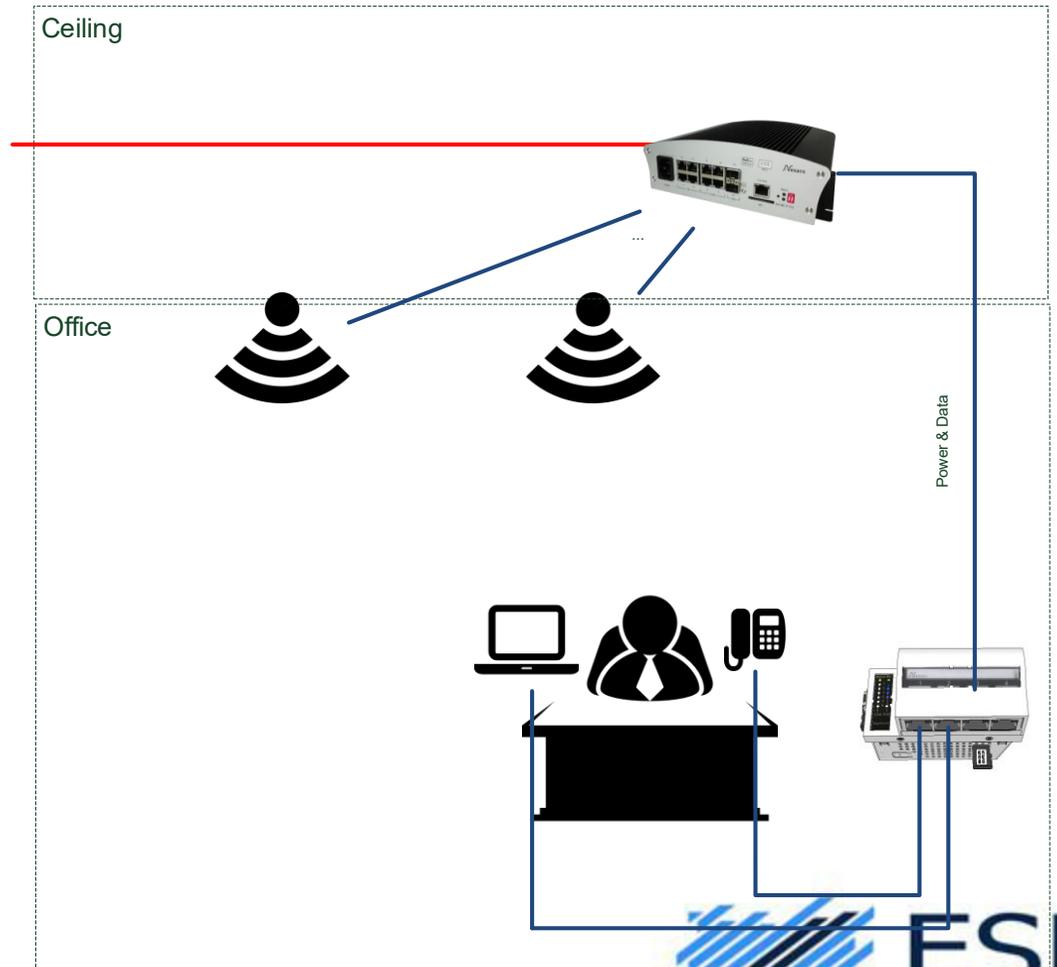
Κατανοώντας την πιστοποίηση

Certifiers

Qualifiers

Verifiers
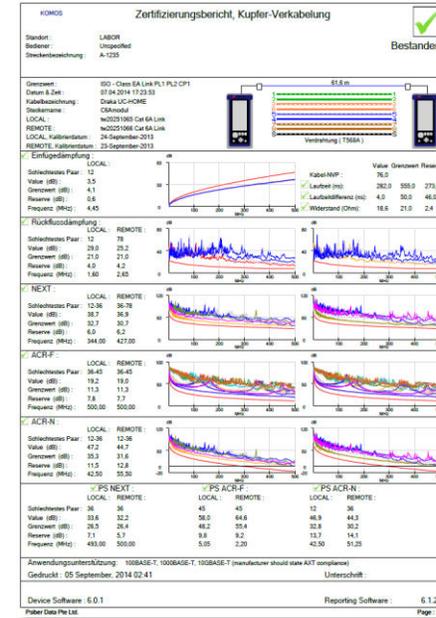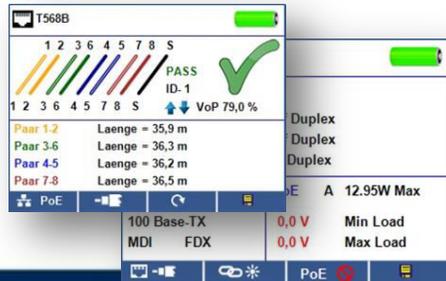
Testing on passive cables

Verification

- Basic test of Structured Cabling
- Wiremap test
- Continuity

Qualification

- This is not certification
- Determining of Ethernet Performance
- Is it in context with the application (IEEE specs)

Certification

- This is not qualification
- Standard acceptance test for networks
  (TIA, ISO global standards)
- Link definitions
- LF and RF measurements and calculated parameters

Should it work for my applications?

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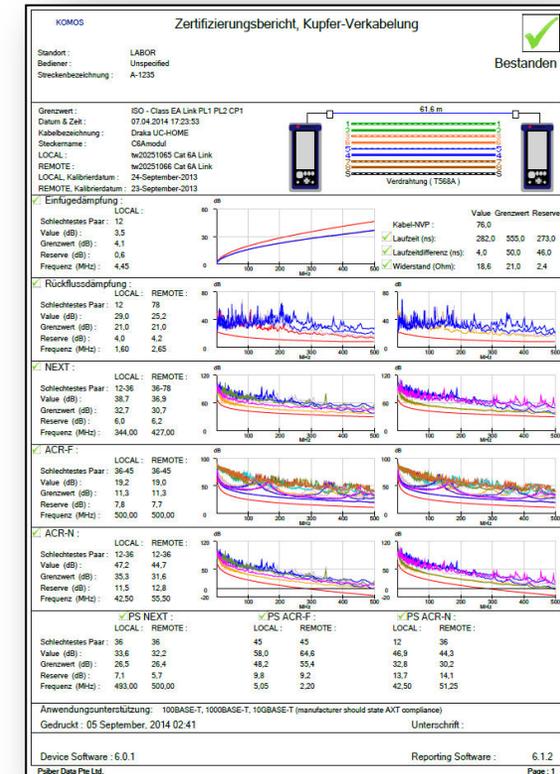
Testing on active networks

Active/Troubleshooting

- Does not include verfication, qualification, certification

- Typical Ethernet problems

- Special testers for troubleshooting (intermittent problems, long term traffic tests, frame test)

Applications Served

Current markets that we address

100 Mbit
1000 Mbit

New markets with the introduction of NetXpert XG

NEW NBASE-T DATA RATE 2.5/5.0 Gbit

10 Gbit

SOHO Small office home office

Data Center

Ethernet

Industrial Automation

Office

Provider
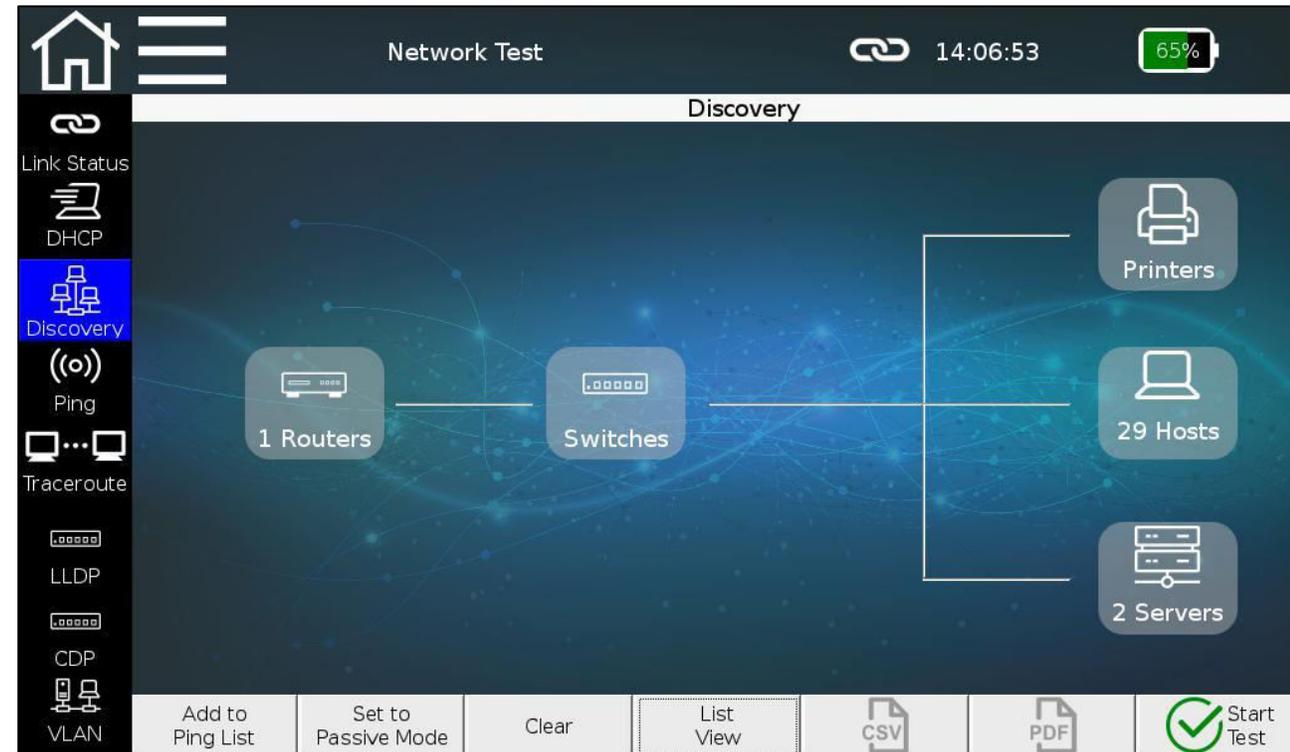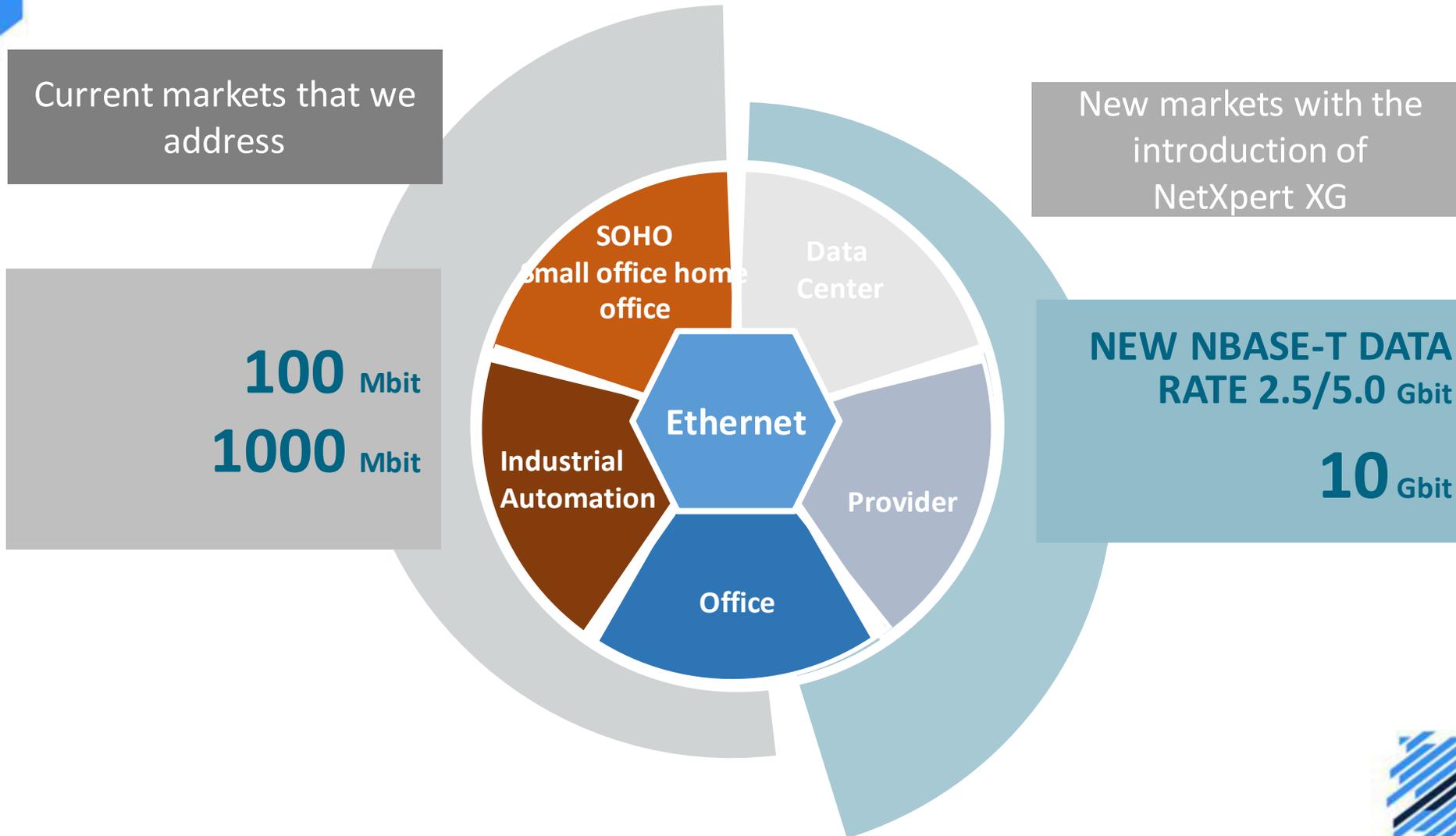
Only selected links will need higher datarates

- Most of the connected clients will continue with 1GBit/s for the next years
- In real life, only selected devices in existing installations will be upgraded and will require higher link speeds

Switch

Camera

Access Point

Server

Storage

Workstation

Workstation

Workstation
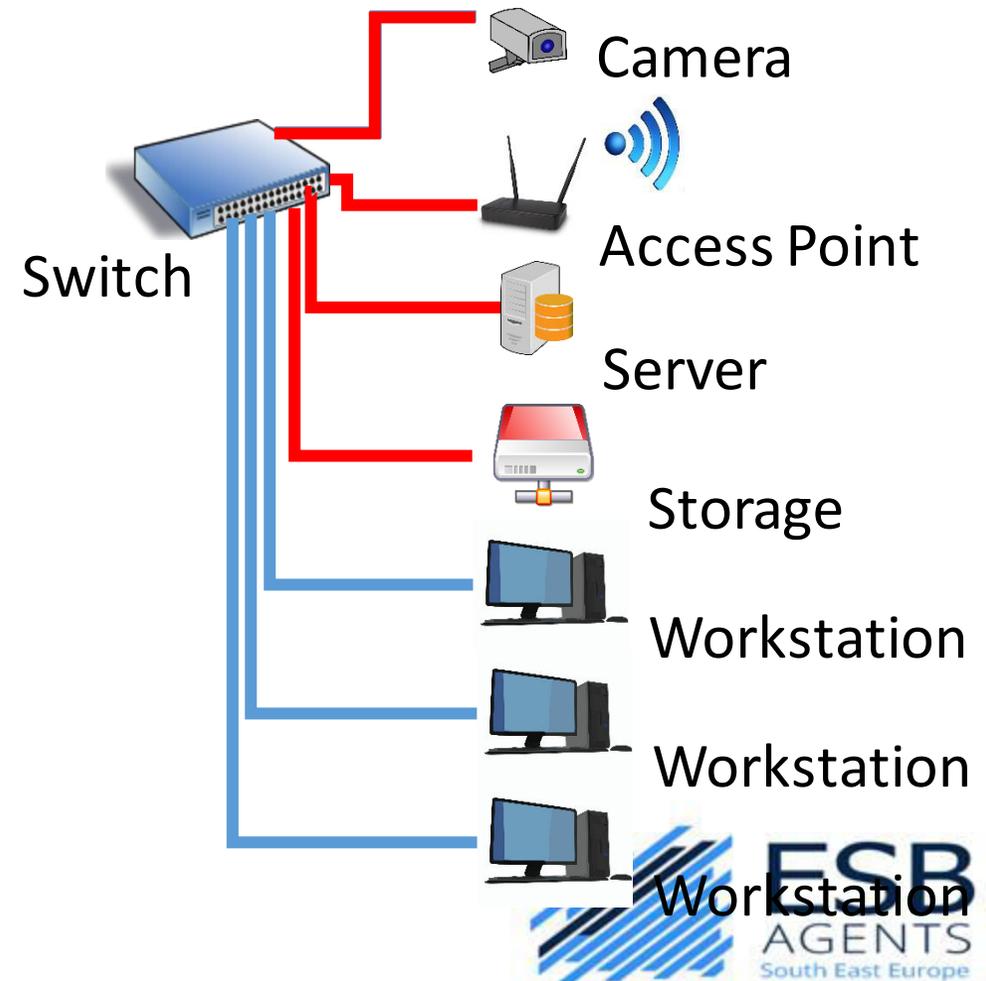
Next generation Net**X**pert

- Qualifies data cablings up to 10Gbit/s
- Combines 3 different tests for reliable test results
- Troubleshoots passive and active networks
- SFP/SFP+ for fiber support
- PoE/PoE+/PoE++ load tests
- Multilingual software support

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NetXpert XG is the only qualifier running 3 tests to 10G speeds

SNR Signal to Noise Ratio — 1

- The ratio of signal power to the noise power
- When signal power gets too low and noise power too high, data can not be detected by receiver

BERT Bit Error Rate Test — 2

- Selectable cable types and BERT speeds (1, 2.5, 5, 10 Gigabit Ethernet)
  - A BERT passes, if bits that are sent in a defined time, return without any loss.
- Load generation up to 10Gbit/s and testing if transmission errors occur

Delay Skew — 3

- Delay difference between pairs caused by different twisting.
- From 1 GbE, all 4 pairs are used. The data is split between the pairs and then re-assembled on the other side.
- If the delay difference is too high, then data can not be recovered by the receiver, resulting in repetition or speed reduction

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NetXpert XG – Cable testing

- Graphical **wire map** display
- Measures and displays **length** for each pair in feet or meters
- Improperly terminated cables are clearly displayed
- Detects **Length to Opens and Shorts**
- Displays **crossings**, **swaps** and **split pairs**
- Tone generation
- Testing and ID Remotes
  - up to 8 Full Wiremap Remote
  - up to 24 Mapper IDs available for identifying ports

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NetXpert XG– Qualification

- Configure Project (Customer name, Report type)
- Choose cable type
- Define cable labelling
- Start test and get result (test cables in sequence or in disorder, easy to retest)

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NetXpert XG– Qualification

Or simply select desired cable speed and start testing without the need of setting up a project

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NetXpert XG
Active Testing and Troubleshooting

Network Tests and Diagnosis

- Link Status
- DHCP test
- Network Discovery
- Ping list
- Traceroute
- VLAN detection
- PoE/PoE+/PoE++ load test
- IPV4/IPV6 Support
- Discovers CDP and LLDP Protocols
- VLAN detection
- Link Light

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NetXpert XG– Network Test

- Get information about the connected Link
- Trigger DHCP and show given information
- Show VLAN information when available
- Show LLDP and CDP information when available

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NetXpert XG– Network Discovery

- Graphical network discovery gives an overview on reachable devices within same subnet
- Network discovery list-view shows all devices and lets you directly transfer them into the ping list
- Duplicate IP addresses are marked in red for you to detect them easily

NetXpert XG– Network Discovery

Simply export your results to your PC and analyse them i.e. with Excel

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NetXpert XG– Ping List

- Enter IPv4 or IPv6 addresses
- Enter Domain names
- Get addresses from the Network Discovery function
- Continuously ping all addresses in parallel

NetXpert XG– Traceroute

- Enter IPv4 or IPv6 addresses or Domain names
- See number and details of hops to target
- Detect location of trouble
  - Internal
  - External
- Document via CSV and/or PDF
  - E.g. evidence for provider

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NetXpert XG– Tools

- Show PoE class and perform a load test
- Perform a single BERT test, define how long the test runs and get detailed results
- Continuous wire map testing

NetXpert XG - Upgradable

- Available for 1G, 2.5/5G or 10GBit/s

- Speed upgrade through licensing system

- Use report generation on main unit or eXport PC software

- Use standard SFP/SFP+ for fiber testing no special measurement hardware needed

- Use two main units or one main and one active remote depending on your needs

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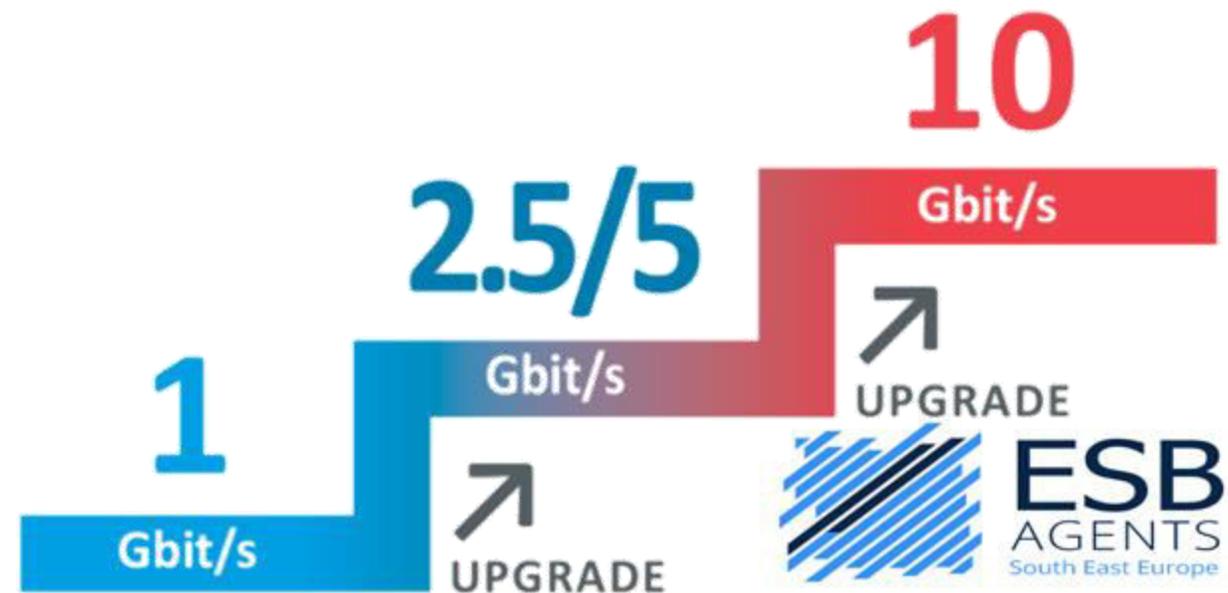
**Smart Choices,
Smart Design, Smart Testing**

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