

COMMScope[®]



Future Ready Design with NBASE-T Technology

8/15/18

Webinar Speakers



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Distinguished Engineer, Cisco
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@petergjones
@nbasetalliance

Agenda



NBASE-T

Peter

Who we are

Charlie

Next Generation Trends

Charlie

Infrastructure for the Future

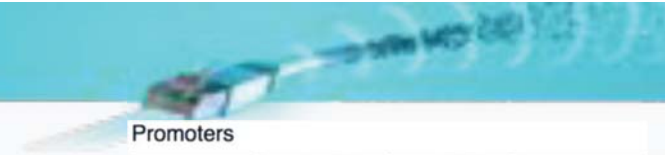
Charlie

Wrap-up & Discussion

Charlie/Peter

NBASE-T Alliance Overview

- Alliance purpose (www.nbase-t.org)
 - Vendor alliance for 2.5G/5G BASE-T
 - Successfully helped build consensus and streamline development of IEEE 802.3bz standard
- Alliance members
 - Member companies representing all areas of network infrastructure
- Alliance role
 - Educate the market
 - Facilitate interoperability
 - Enable widespread deployment
 - Augment NBASE-T specification as needed



Promoters



Contributors



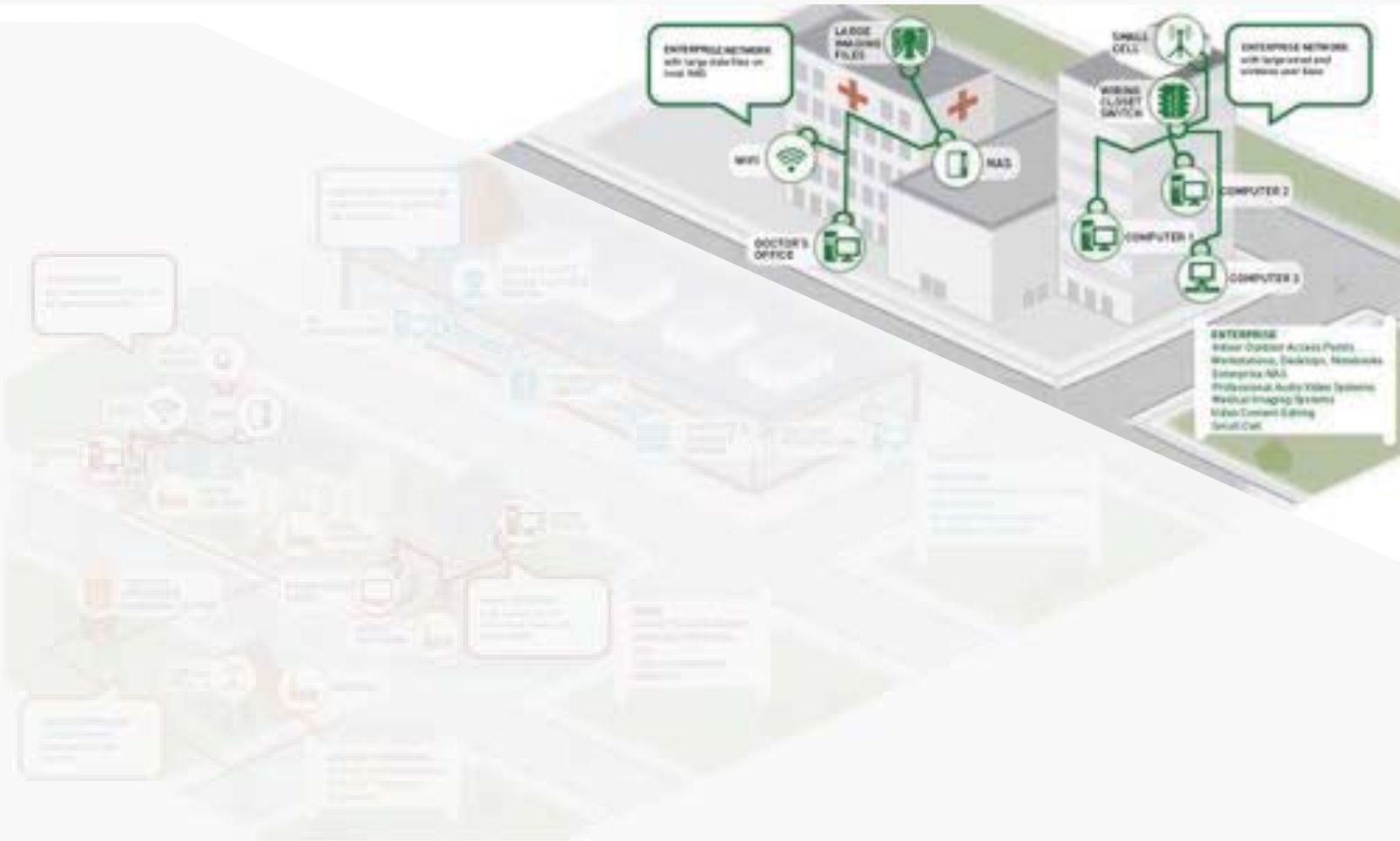
Adopters



Liaisons



NBASE-T Application Areas



Enterprise:

- Switch
- Wireless AP
- Desktop
- Storage
- Small Cell

Industrial:

- Switch
- Wireless AP
- Workstation
- Storage
- Compute
- Machine Vision

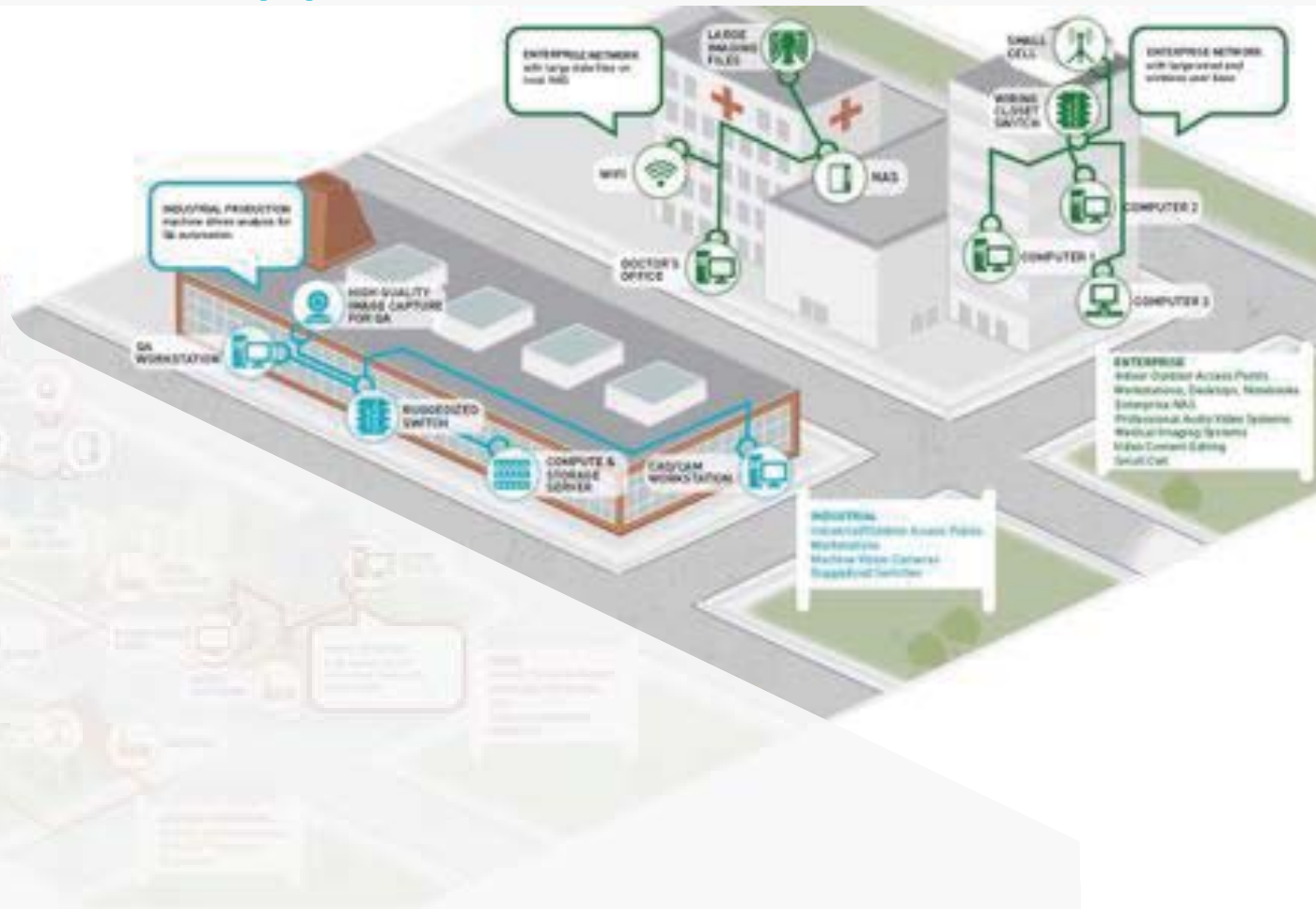
Home:

- Switch
- Wireless AP
- Storage Server
- Home Gateway
- Streaming Media

Service Provider:

- Small Cell
- Home Gateway

NBASE-T Application Areas



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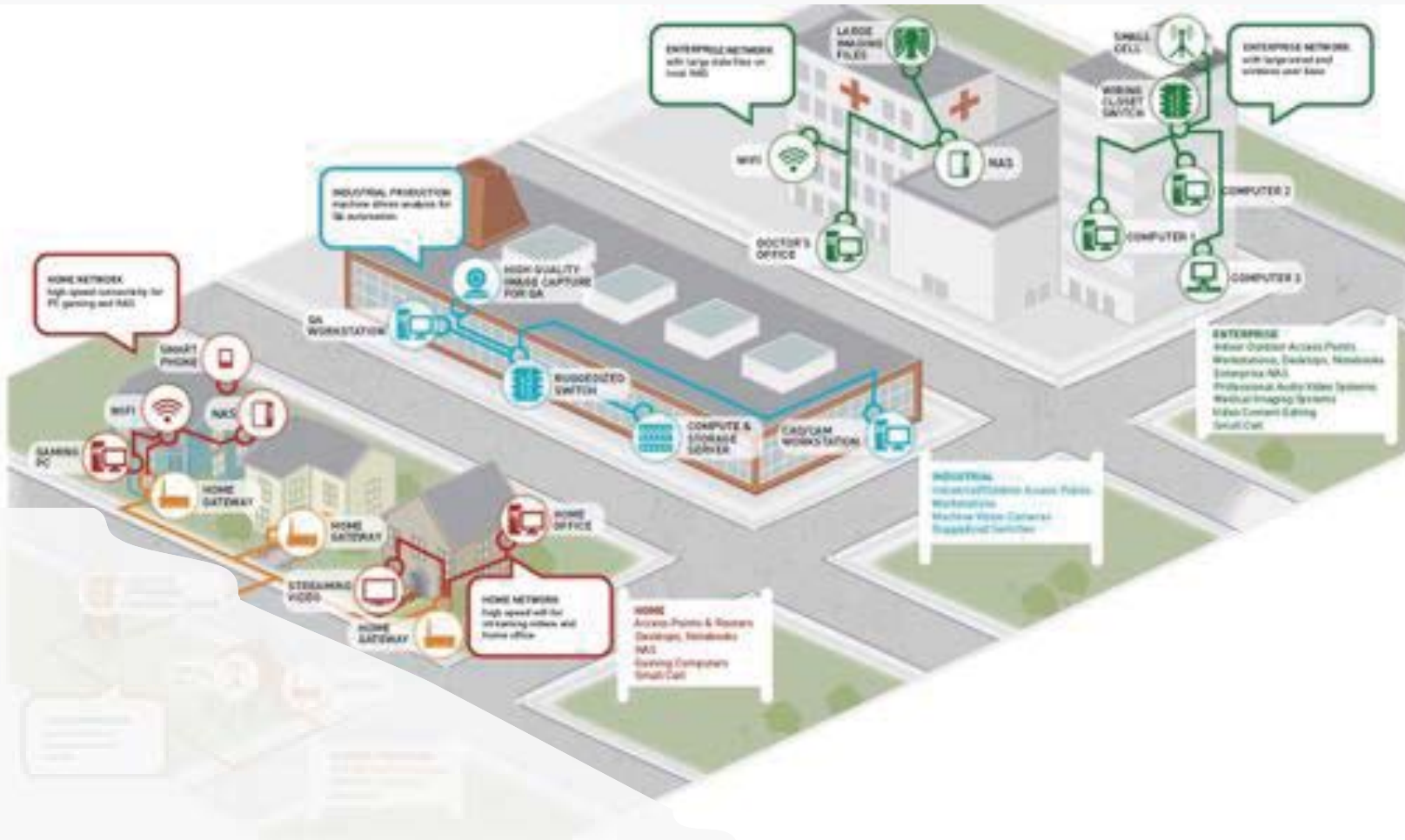
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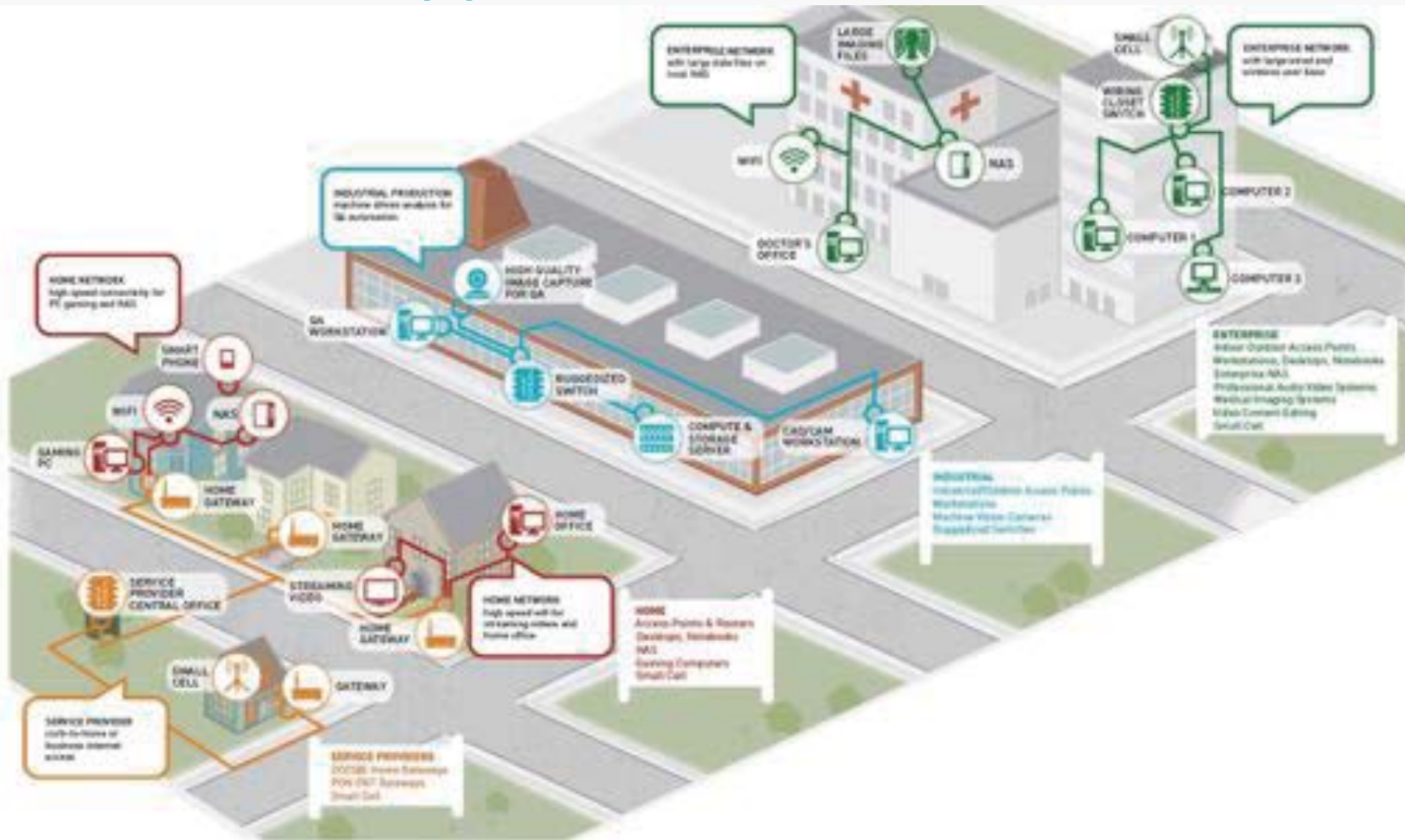
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NBASE-T Products



NBASE-T Alliance Member Companies

Component

Aquantia
Aruba HPE
Bel Magnetic Solutions
Cisco
GLGNet
Intel
KinnexA
Marvell
Microsemi
NXP

System Level Product

Aquantia
Aruba HPE
Brocade
Cisco
Microsemi
Netgear
Pleora Technologies
Tehuti Networks
Teledyne e2v

Test Equipment

Aukua Systems
Spirent
Tektronix
Xena Networks

Non-Member Companies

Component

Akitio
Dell
Gigabyte
Promise Technology
QNAP
Sonnet

System Level Product

Accton
Apple
ASRock
ASUS
Buffalo
Dell
Dell EMC
KDDI
Lenovo
MSI
Promise Technology
Sonicwall
StarTech
Supermicro

Value of NBASE-T Technology



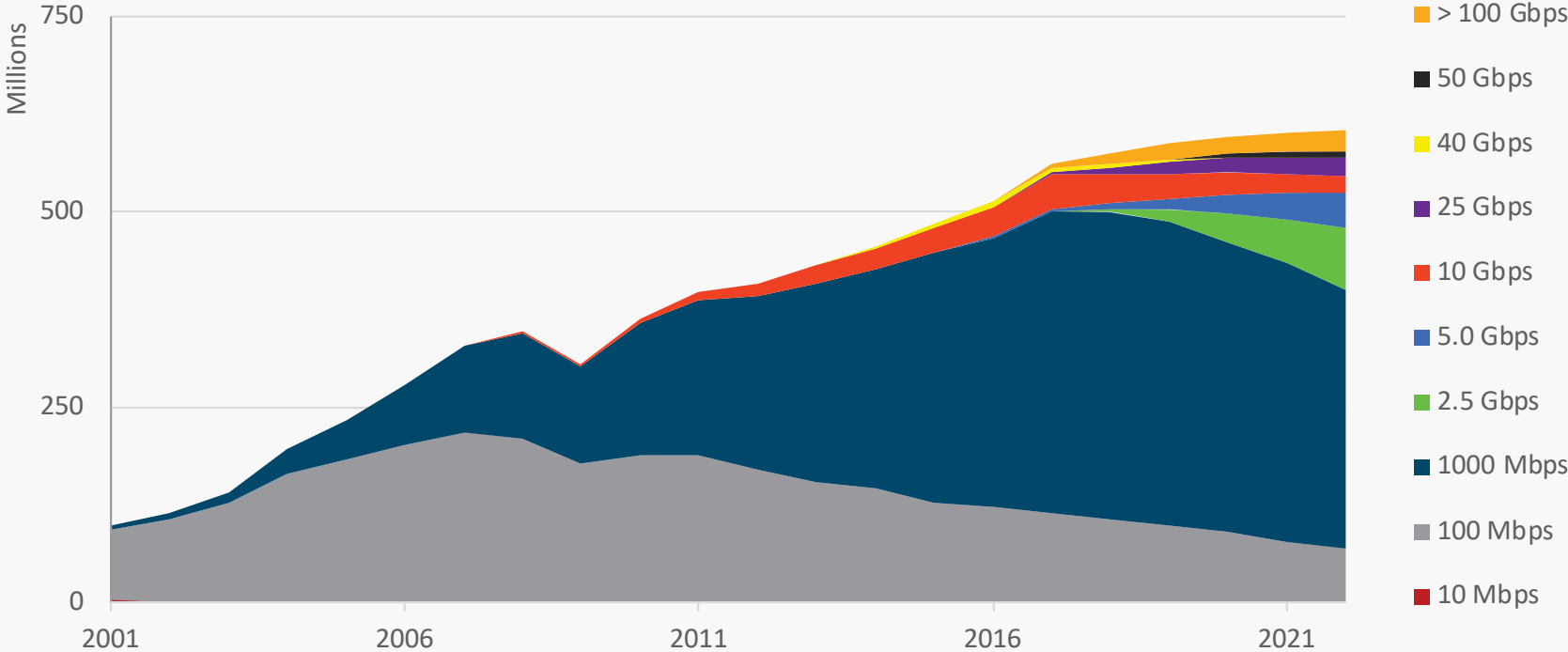
- Leverages 1.3+ billion Cat5e/Cat6 outlets (2014) and 70+ billion meters of Cat5e/Cat6 cables, 90+% of the installed base
- Enables network evolution by providing up to 10x faster speed without pulling cables or requiring building construction
- Supports high-speed links to next generation WiFi access points, and other high data rate devices such as PC, workstation, imaging system, file server



Outlook for NBASE-T Technology

Strongest growth out to 2022

Ethernet Switch Ports
Dell'Oro Group Ethernet Switch 5-year Forecast Jan 2018





Who is CommScope



About CommScope



Wireless Networks

Data Center Networks

20,000+
global employees

30+
Global manufacturing
and distribution

\$200M+
Annual R&D

10,000+
Global patents and
patent applications

Commercial
Building Networks

Wireline Networks



Next Generation Trends



Workplaces Going Through Disruptive Age



REMOTE
POWERING



LAYOUTS



MOBILITY



CONNECTIVITY

Integrated Approach - Scale, Manage, Optimize

10%

Growth

POE devices
per year
through 2020

(Dell' Oro Group)

70%

US Based offices

Implemented
open office
layouts

(PGI)

5.7%

WLAN Market

Growth

In 2017

(IDC)

NBASE-T
ALLIANCE™

89%

Ethernet Switch

Ports

1G or more
by 2022

(650 Group)

45%

M2M nodes

Of global
connections
by 2021

(Cisco)

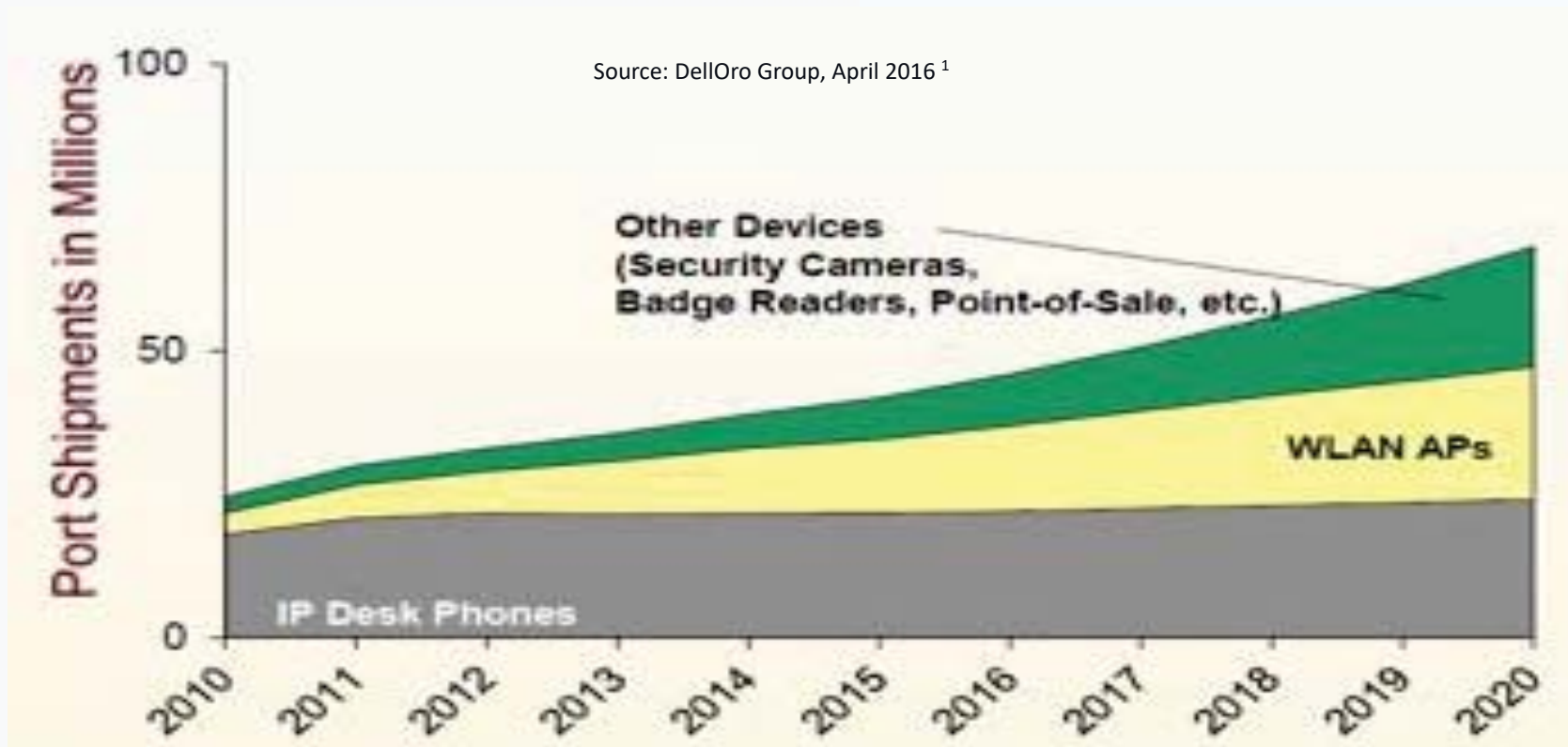
New Devices, More Connections

Outlets/nodes/links, Data, WAPs and IoT, US, million units, 2015 – 2021

Source: BSRIA survey and modelling May 2017



PoE Enabled Device Shipments

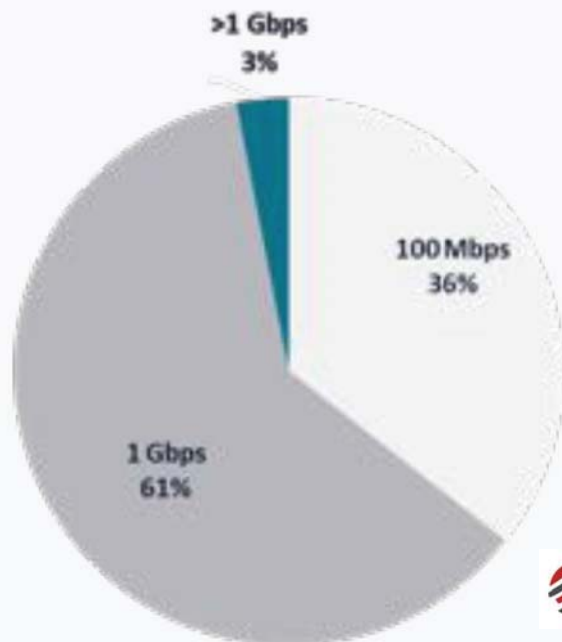


1. Ethernet Alliance PoE Webinar <https://www.brighttalk.com/webcast/6205/199275/analyst-hour-webinar-on-ieee-poe>

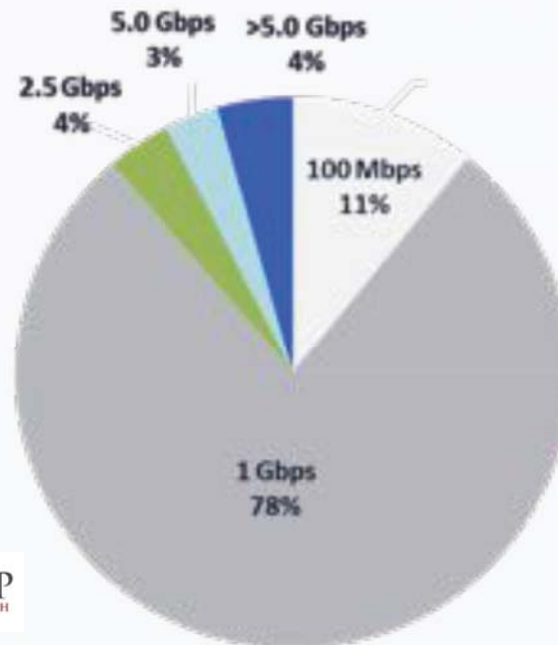
NBASE-T Paves the Growing Path



**Switch Port Installed Base
(>1.2 B Ports end of 2016)**



**Projected Switch Port Installed Base
(>1.5 B Ports end of 2022)**



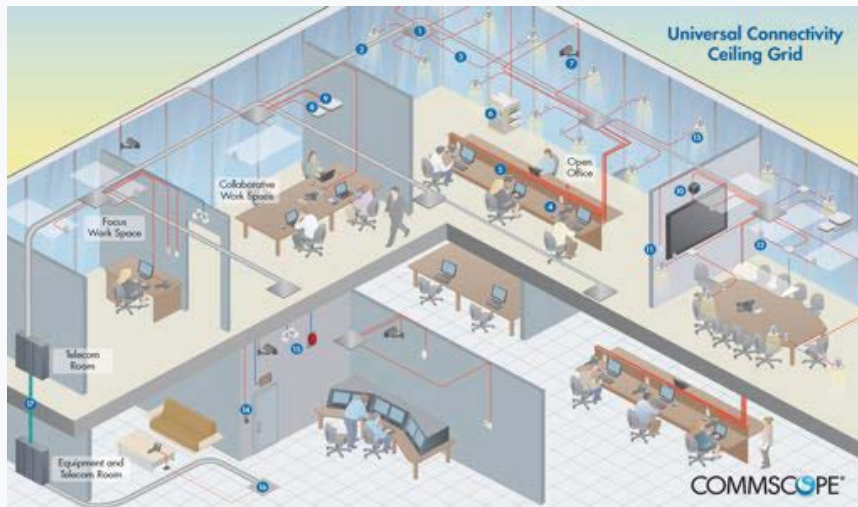
[NBASE-T/650 Group Webinar - Growth of NBASE-T: Market Trends & Forecasts](#)



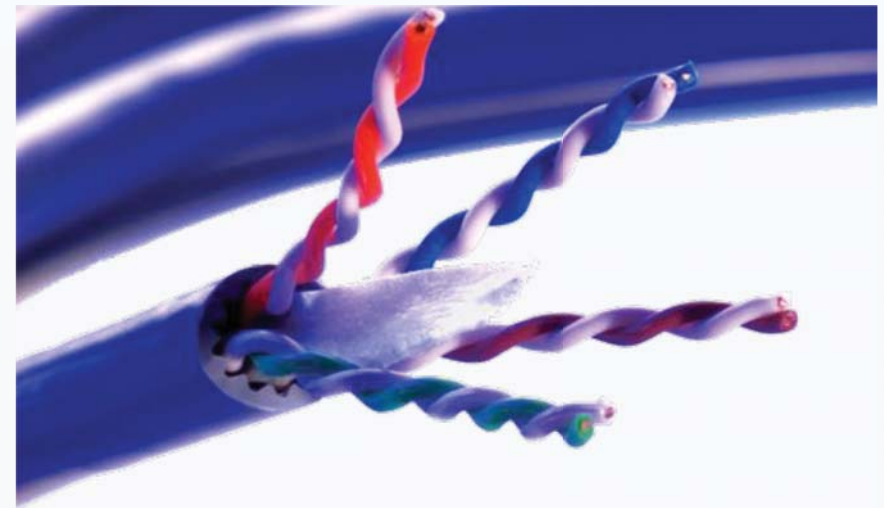
Infrastructure for the Future



Two Step Process

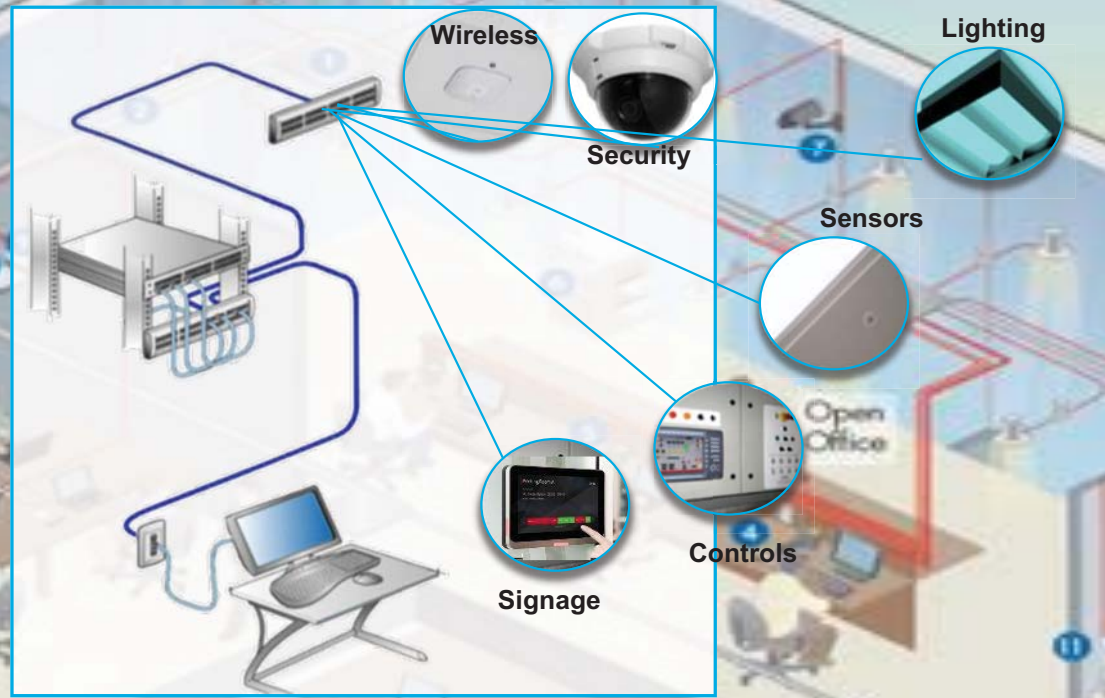
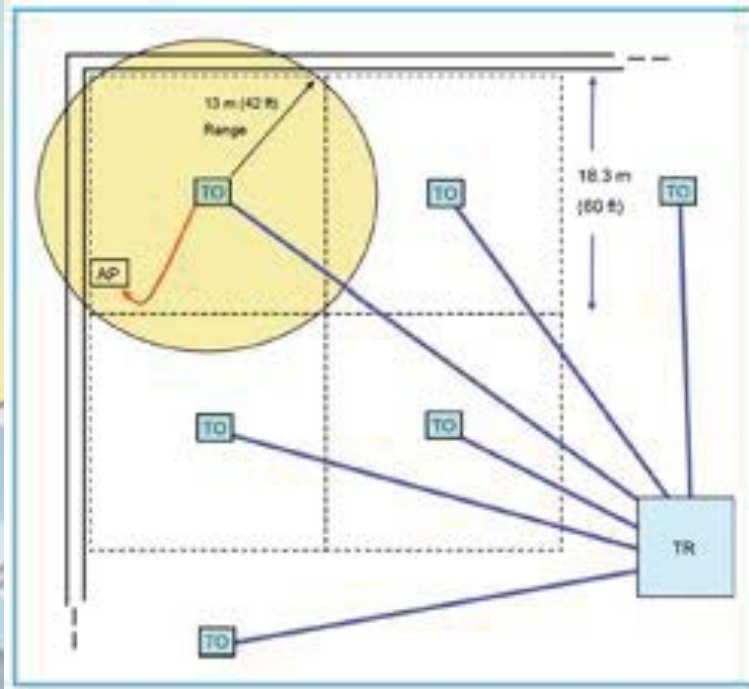


1 - Layout



2 - Technologies

1: Universal Connectivity Grid



TIA TSB-162-A
18.3 m x 18.3m grid
335 m² coverage area
maximum 13 m cord

Define a coverage area service to focus in space and low voltage applications

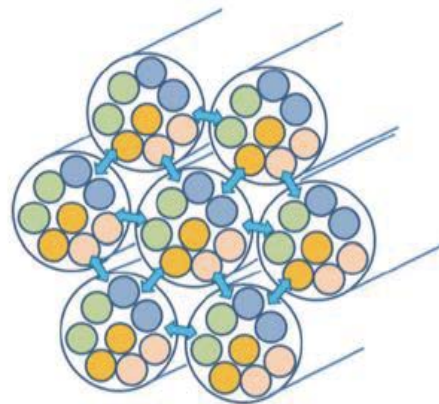
2: New Standards

- NBASE-T 2.5/5G speeds leverage **installed base**
 - Installation practices (e.g., cable-bundling) impacts link capacity
 - Installed Category 5e/6 cabling works in most cases
 - **Category 6A cabling assures 2.5G/5G speeds**



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Figure 2: Alien Cross-Talk in a 6-around-1 Bundle

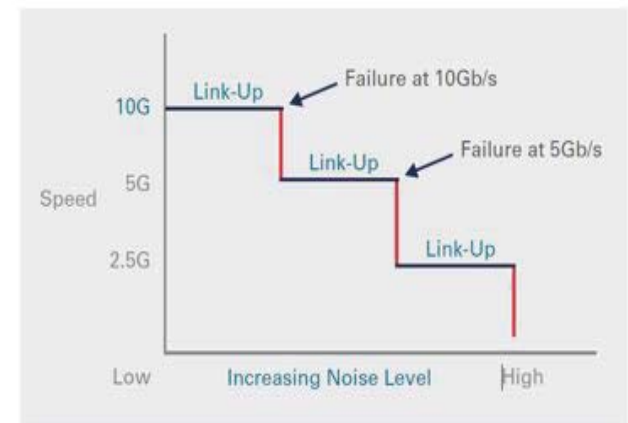


NBASE-T
ALLIANCE™



- NBASE-T **Downshift** simplifies user deployment

Figure 5: Auto-Negotiation/Training Behavior with NBASE-T Downshift



NBASE-T AllianceSM © 2018

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NBASE-T Performance & Cabling Guidelines

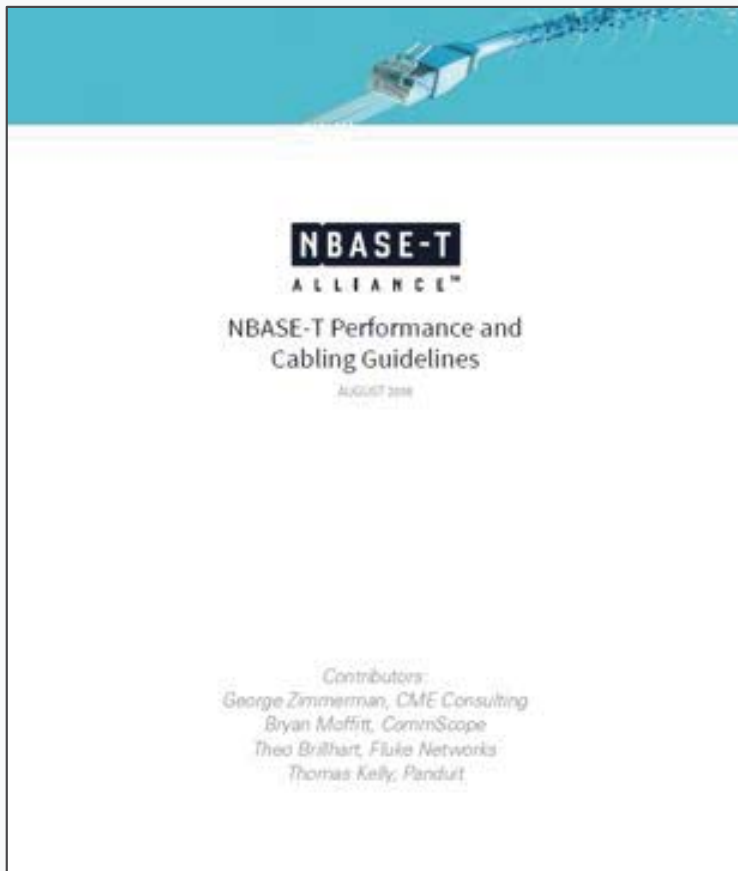
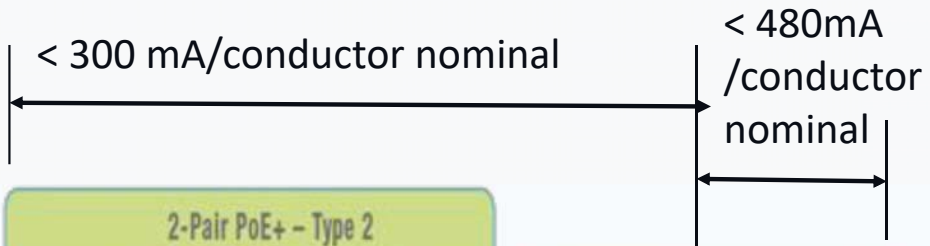


Table 2: ALSNR support risk for 2.5G and 5G applications

Bundled cabling length 0m to 50m	Category 5e	Category 6	Category 6A
2.5GBASE-T	Assured	Assured	Assured
5GBASE-T Assured	Assured	Assured	Assured
Bundled cabling length 50m to 75m	Category 5e	Category 6	Category 6A
2.5GBASE-T	Assured	Assured	Assured
5GBASE-T Assured	Medium	Assured	Assured
Bundled cabling length 75m to 100m	Category 5e	Category 6	Category 6A
2.5GBASE-T	Medium	Assured	Assured
5GBASE-T Assured	High	Medium	Assured
ALSNR Risk	High	Medium	Low

Remote Powering Evolution



PoE Types and Classes	2-Pair PoE+ - Type 2					4-Pair PoE in Standardization			
	2-Pair PoE - Type 1								
Class	0	1	2	3	4	5	6	7	8
PSE Power (W)	15.4	4	7	15.4	30	45	60	75	90
PD Power (W)	13	3.84	6.49	13	25.5	40	51	62	71

4-Pair PoE - Type 3 (under classes 0-4)

4-Pair PoE Type 4 (under classes 5-8)





TSB-184-A

TIA 569.D-2

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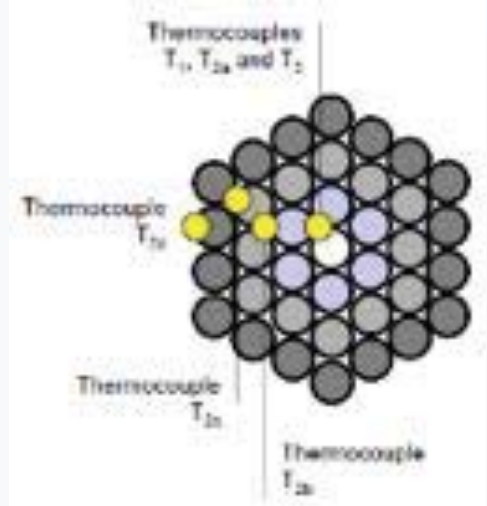
Design and Installation for 4PPoE



Open Air / Tray



Conduit



	26 AWG		Category 5e 24 AWG		Category 6 23 AWG		Category 6A 23 AWG	
	Air	Conduit	Air	Conduit	Air	Conduit	Air	Conduit
600 mA	24	24	214	146	282	205	350	272
720 mA	24	24	137	91	183	129	227	172
1000 mA	24	16	58	36	82	53	101	71



Wrap-up & Discussion



Wrap-up & Discussion



Workplace/technology evolution puts pressure on existing infrastructure

Installed Category 5e/6 cabling works in most cases, field inspection and mitigation might be required

Zone cabling approach provides flexibility for mobile and IoT adoption

Future ready designs driven by better technologies and best practices

Category 6A for new installs is better for both NBASE-T and 4PPoE



Thank you!

Visit www.nbaset.org & www.CommScope.com
for more information