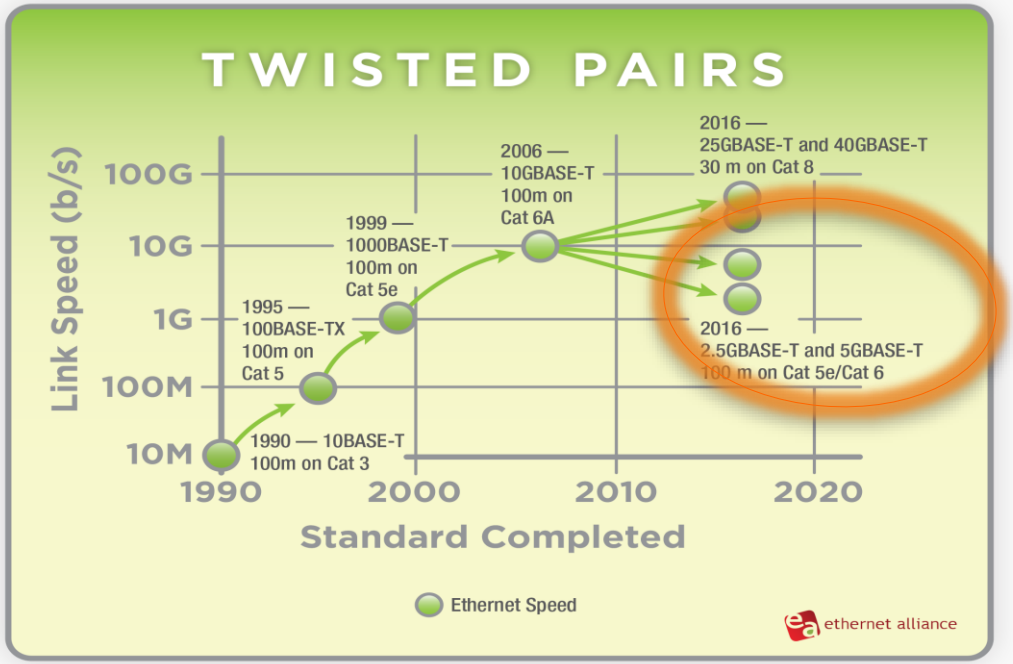
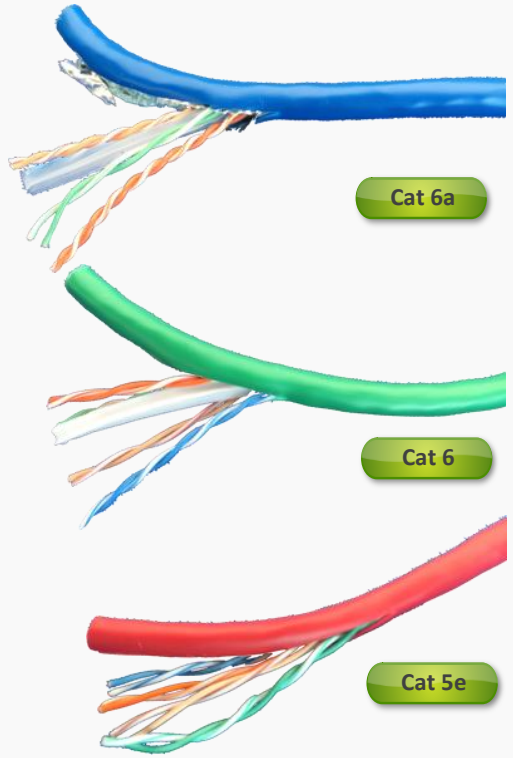
Vive La Ethernet Evolution! Effortlessly Speed Your Network 5x with NBASE-T

George Zimmerman

Board of Directors, NBASE-T Alliance

When there's a fork in the road…



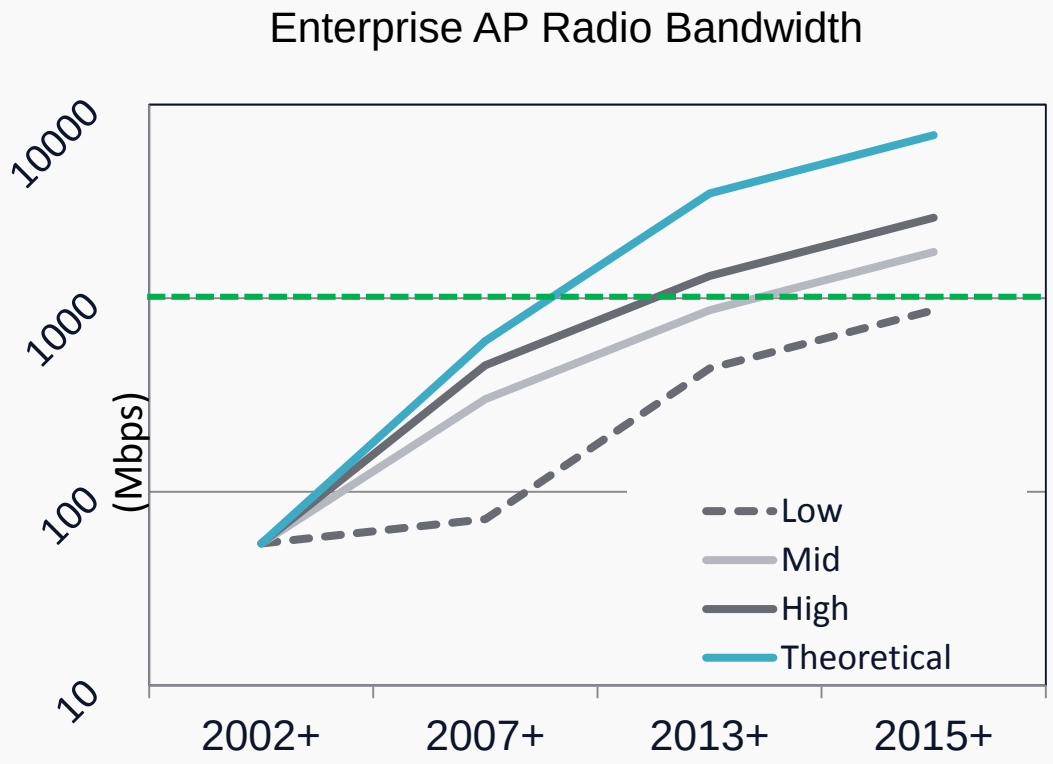


Take it!

NBASE-T ALLIANCE

802.11ac transitions

With 802.11ac, wireless crosses a gigabit

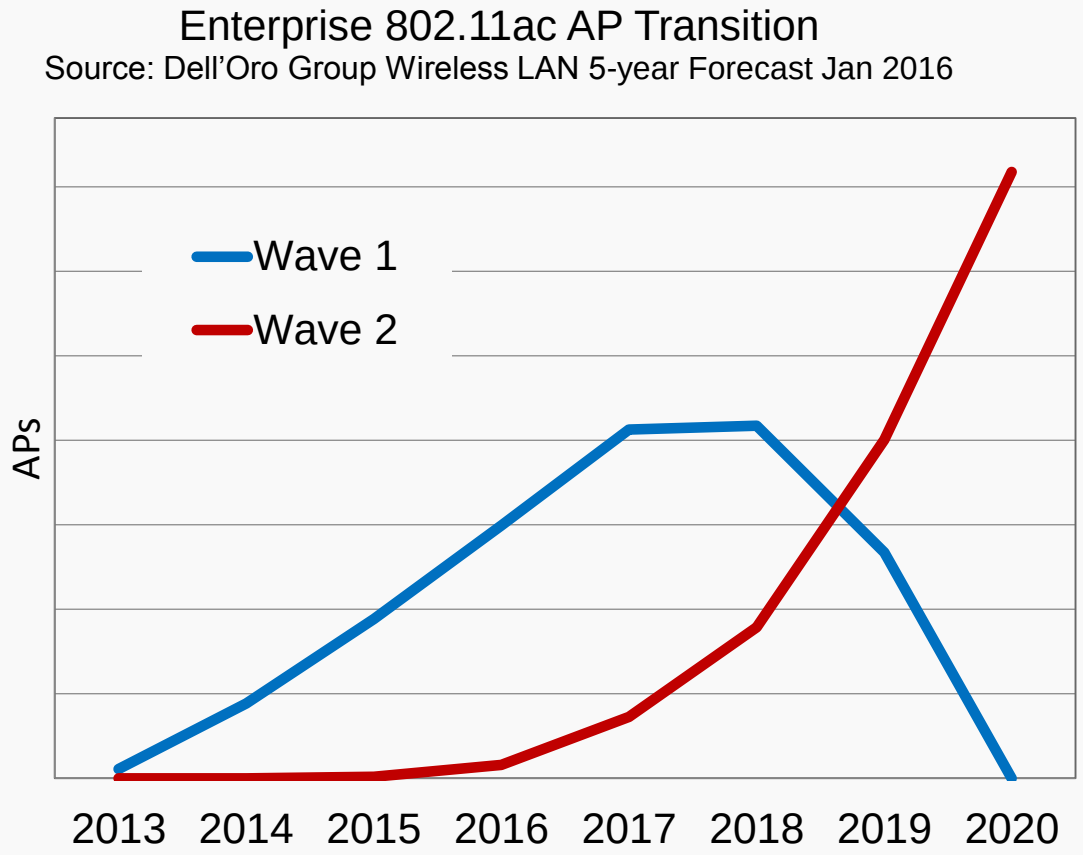


802.11 in time:

2002-2006:	802.11g/a
2007-2011:	802.11n
2013-2015:	802.11ac W1
2015-2017:	802.11ac W2

11n to 11ac is a rapid transition

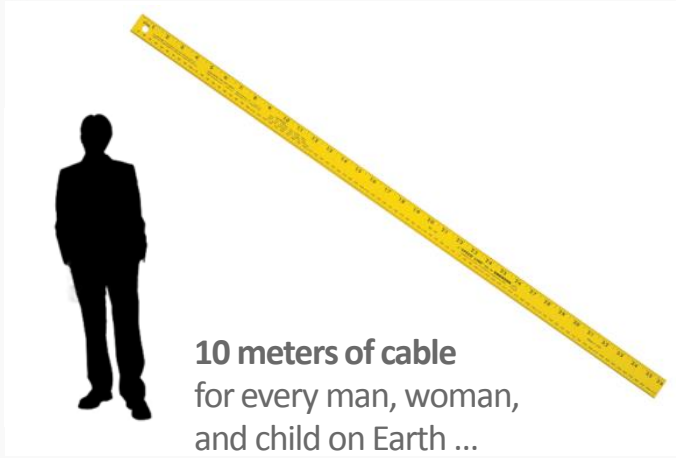
802.11ac Wave 2 starts ramping in 2016

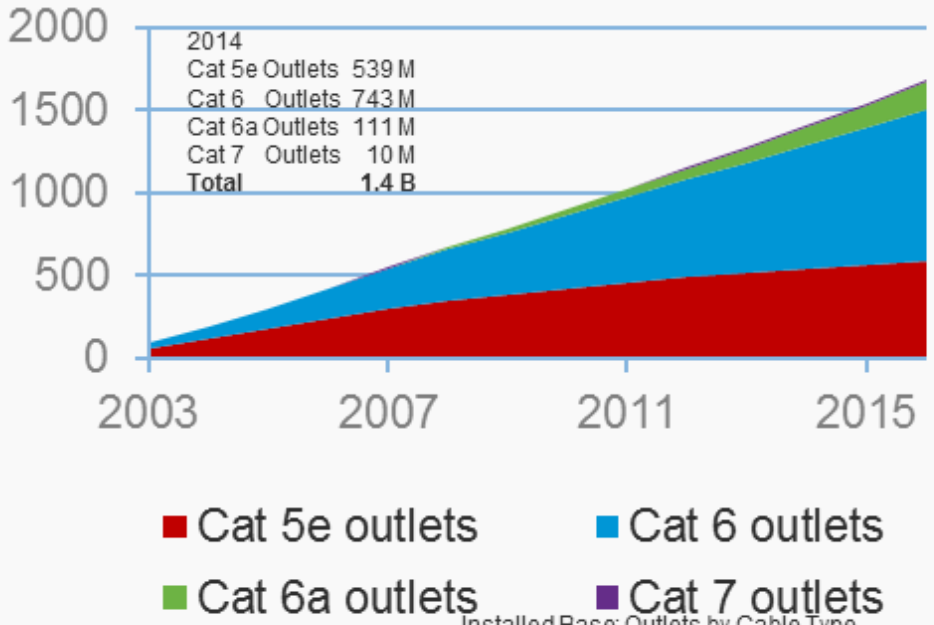


NBASE-T ALLIANCE

Why 2.5G and 5GBASE-T?

- Between 2003 to 2014 ~70 billion meters of Cat 5e and Cat 6 cabling were sold….
  - In 2014, 1.3 Billion outlets, ~90% of installed base
  - Enormous network infrastructure investment
- Existing specifications support 1Gb/s over this cable, but faster data rates are possible
- BASE-T allows incremental upgrade
  - **Lets get more value from this investment!**
  - **What can we enable?**





Installed Base: Outlets by Cable Type
Source:
BSRIA December 14

NBASE-T ALLIANCE

802.3 Ethernet and 802.11 WLAN: Deployments Today

1000BASE-T
Power over Ethernet

Access Switch

Mostly 1000BASE-T ports

PoE PSE (15/30w, *4PPoE)*

Cabling

Cat 5e/6/6A up to 100M

New installs using Cat 6A for 10+yr life

Access Point

Connects 802.11 to 802.3

PoE PD (Powered Device)

Footprint sensitive (e.g. power, heat, etc.)

11acWave 2 drives backhaul traffic > 1 Gb/s.

No easy way to get above 1Gb/s.

- The needs of 802.11ac Wave 2 access points demanded development of NBASE-T/802.3bz
  - Must support: >1Gbps rates, installed cabling and PoE

NBASE-T ALLIANCE

Gigabit Bottleneck

WiFi > **1G**

Cat 5e Cables

Limited to 1G!

- Existing gigabit infrastructure is insufficient to handle
  - 802.11ac deployment
  - Workstations and PCs that handle large data transfers
- Gigabit Ethernet has been around since 1999 and is the bottleneck
- Market needs technology to support >1G over existing cables

NBASE-T ALLIANCE

NBASE-T Alliance℠ - Overview

- NBASE-T Alliance (www.nbaset.org/)
  - Vendor alliance for 2.5G/5G BASE-T with 45+ participant companies.
- Who is in the Alliance?
  - Components, silicon, systems, cabling, test, etc.
- Alliance role?
  - Enable widespread deployment, evolve specifications, facilitate interoperability.

Alliance Strength - Full Ecosystem

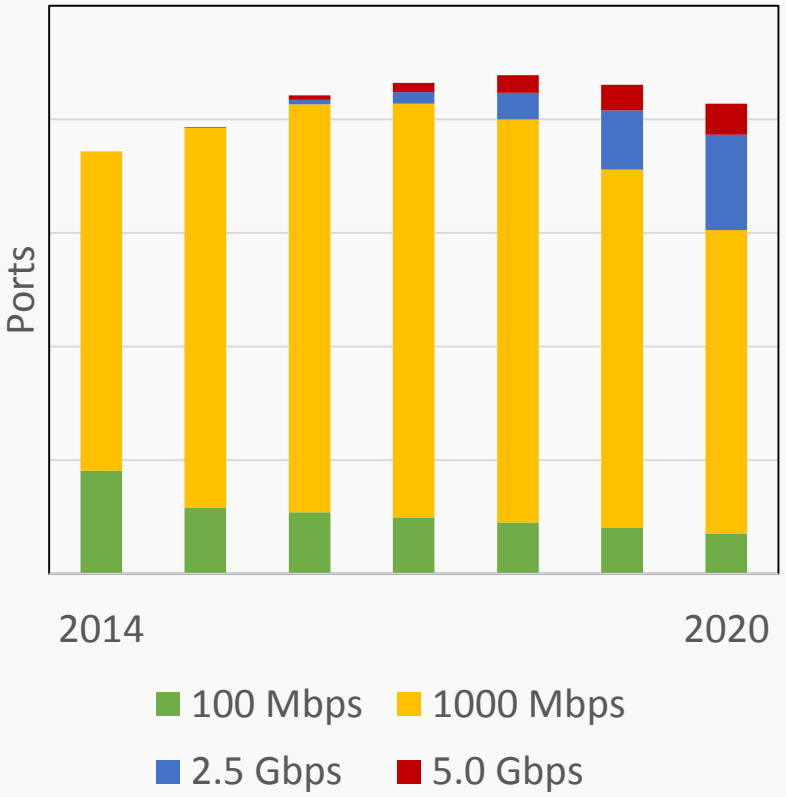
NBASE-T ALLIANCE℠

Where are we now?

- NBASE-T provides 2.5Gbps and 5Gbps over installed cabling
  - NBASE-T downshift matches speed to channel
- 802.11ac Wave 2 APs shipping with > 1Gbps wired backhaul
- IEEE 802.3bz™ received final approval September 2016
- Joint EA & NBASE-T Plugfest October 16
- Cabling standards in final stages to support rollouts

- Rapid transition from 100/100M to 2.5G/5G BASE-T
  - Combined forecast says 25% of ports will be 2.5G/5G BASE-T
  - Over 3 Million Ports in 2017*!

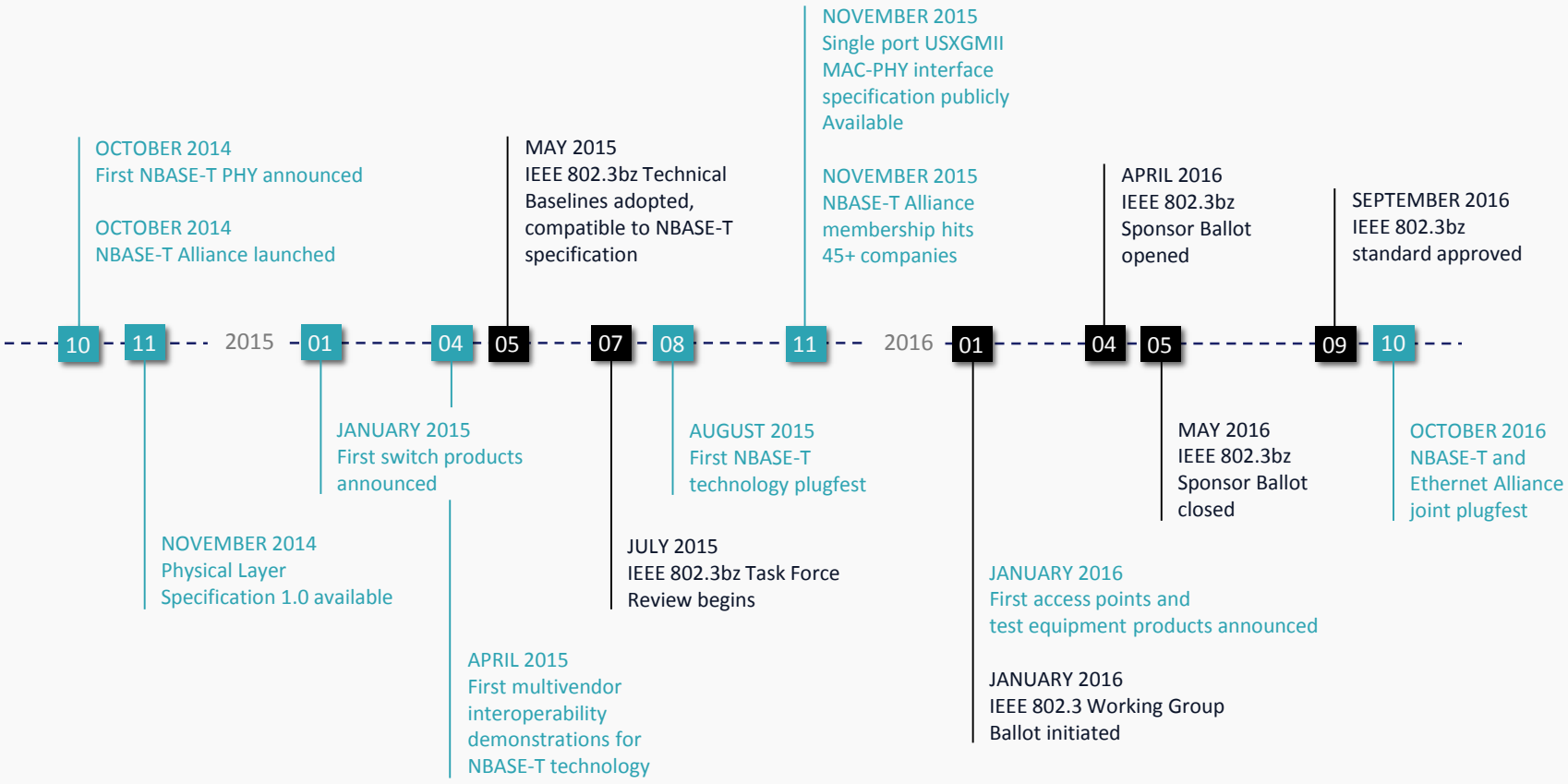
100M/1000M to 2.5G/5G transition
Source: Dell'Oro Group Ethernet Switch 5-year Forecast Jan 2016



* Dell Oro – Sept 2016

NBASE-T ALLIANCE

Timeline of Success



NBASE-T ALLIANCE™

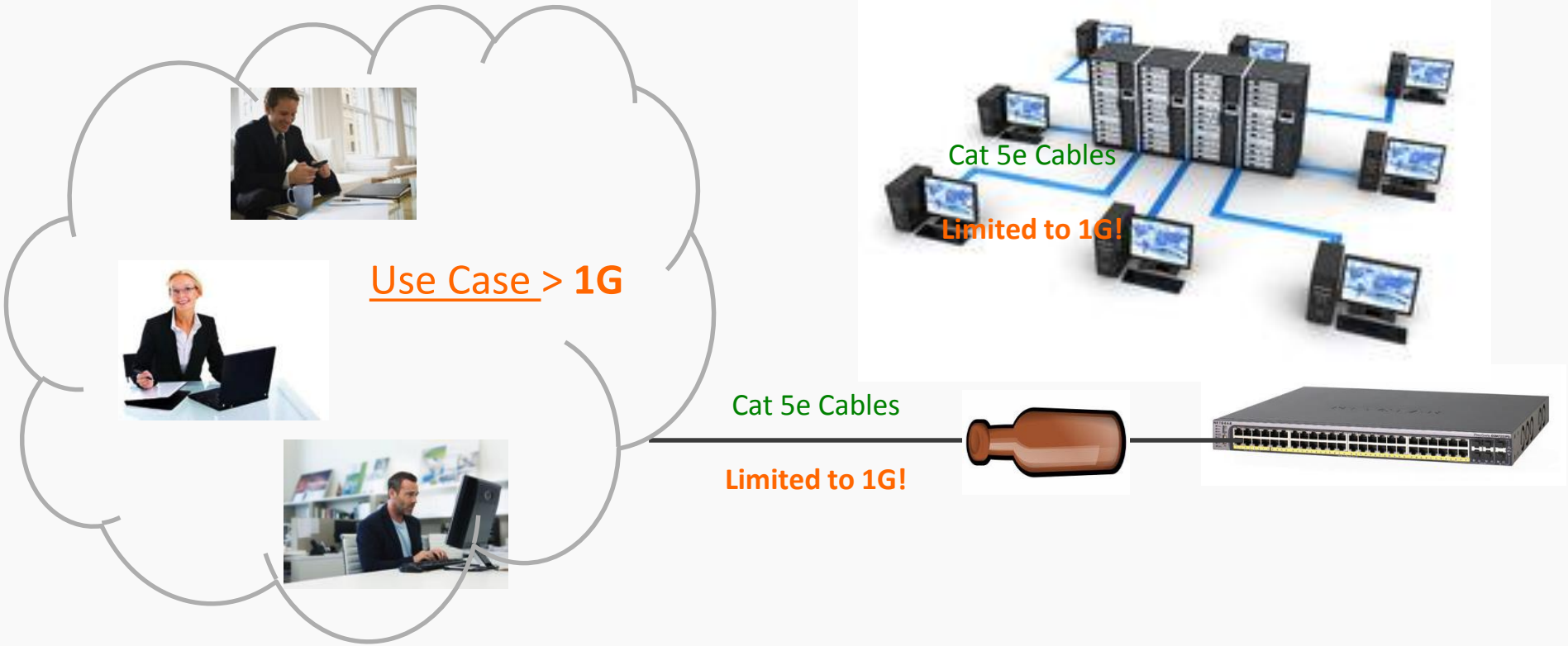
IEEE 802.3bz or NBASE-T?

- Users expect an easy transition, so what's different?
- Minor differences in AutoNeg/link setup
- NBASE-T adds "downshift" to 802.3bz
  - Normal Auto Negotiation selects the fastest rate both PHYs support, irrespective of the cabling, noise or environment
  - But, in 2.5G/5GBASE-T, the speed you get varies with the cabling configuration and other links crosstalking
  - So... "downshift" automatically shifts the rate based on the channel noise
    - Similar to Wi-Fi rate adaptation
- Users always get a reliable link at the best speed for the cabling!

The Answer is: Yes!

NBASE-T ALLIANCE™

Gigabit Bottleneck

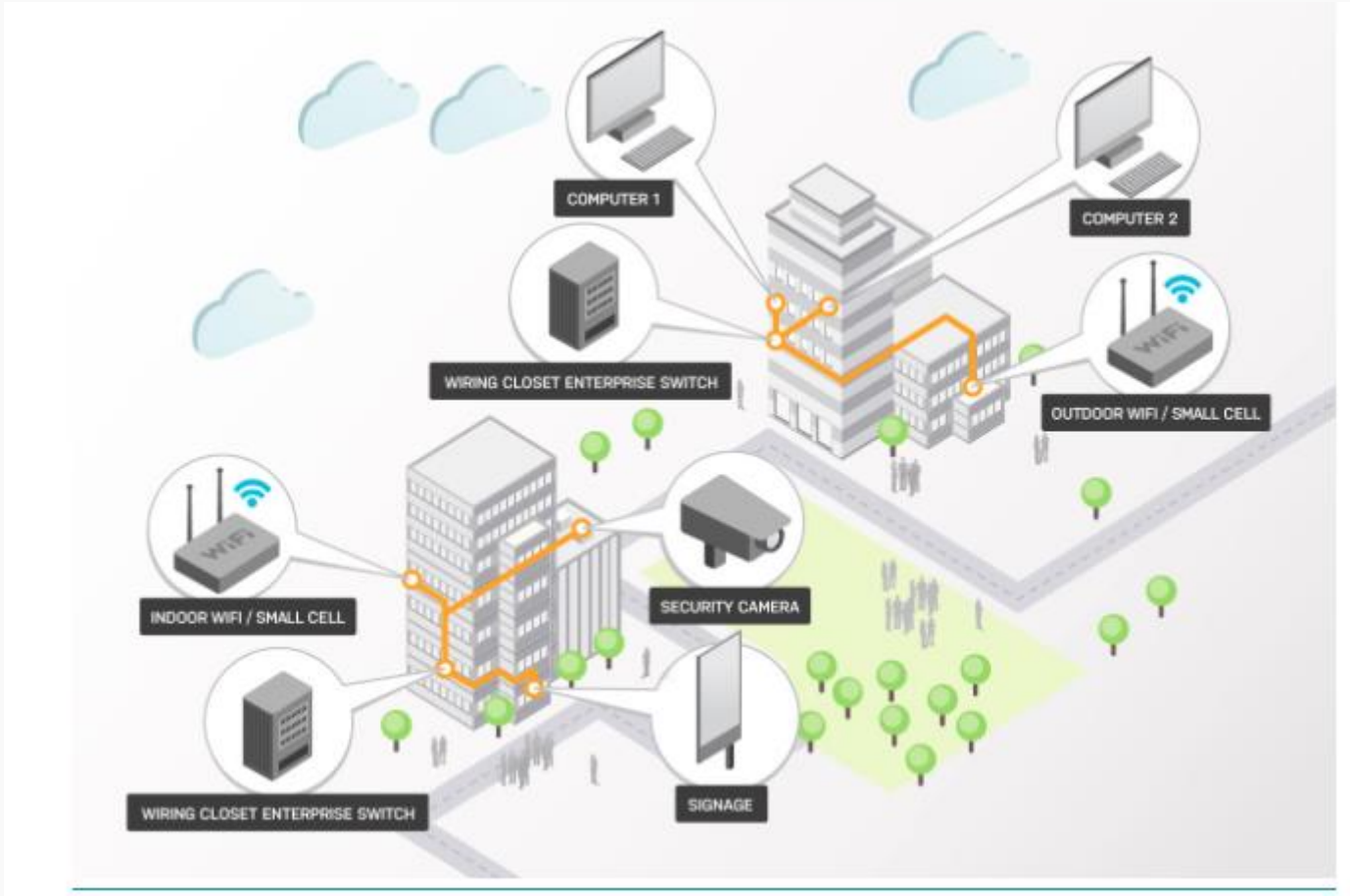


- Gigabit Ethernet has been around since 1999 and is the bottleneck
- Market needs technology to support >1G over existing cables

THE PROBLEM ISN'T WIRELESS LAN BACKHAUL, IT'S NETWORKING – AND IT GENERALIZES

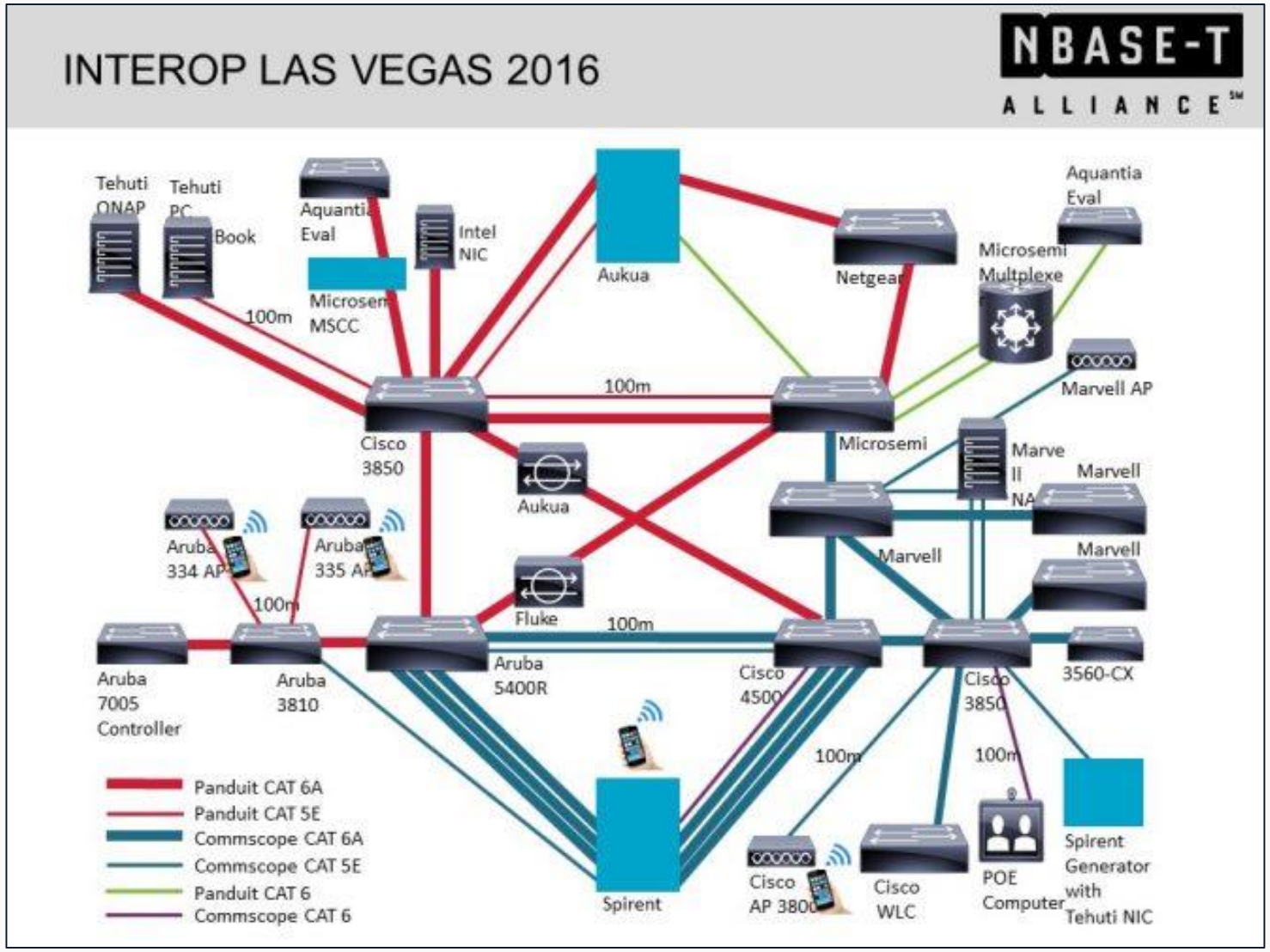
NBASE-T ALLIANCE

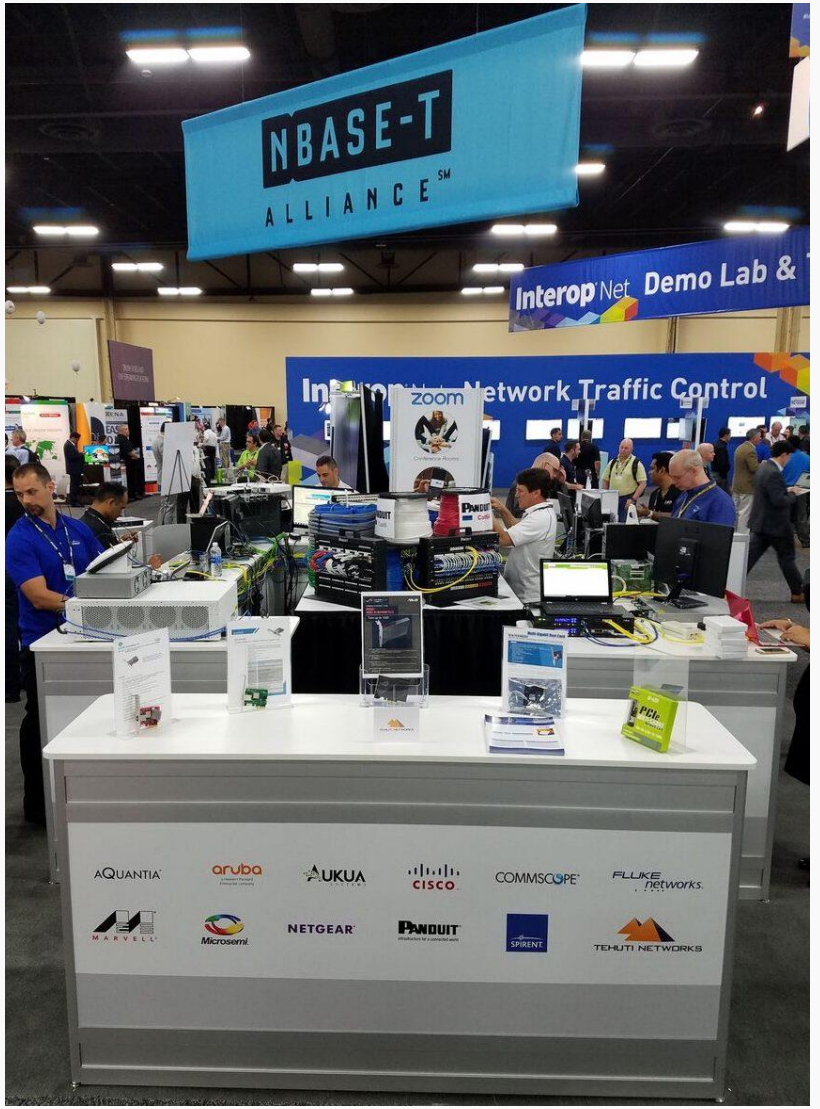
NBASE-T/Ethernet Evolves to Fill Niches



NBASE-T ALLIANCE

NBASE-T Alliance at Interop 2016 Las Vegas





NBASE-T ALLIANCE

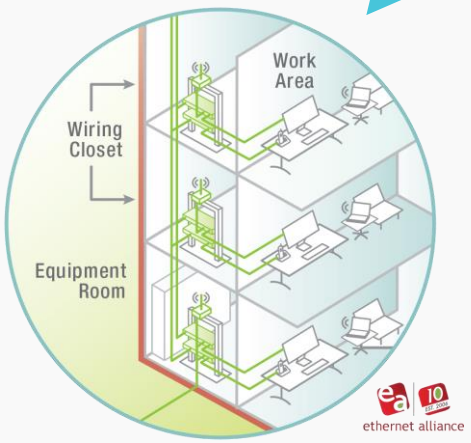
Ethernet finds its uses… Campus

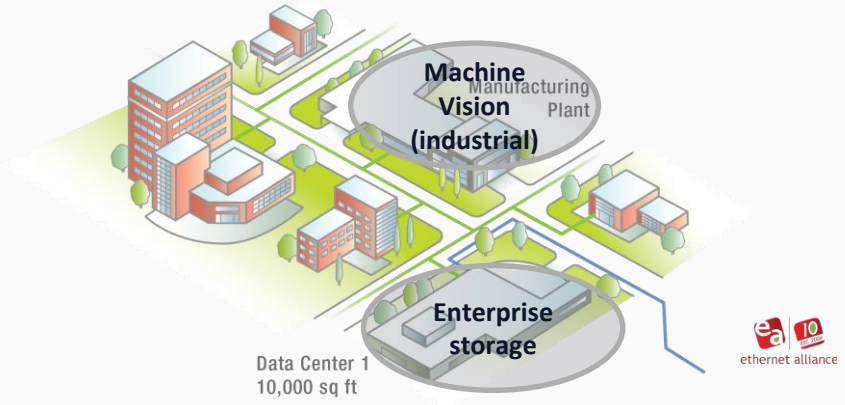
ENTERPRISE

- Indoor/Outdoor Access Points
- Workstations, Desktops, Notebooks
- Enterprise NAS
- Professional Audio Video Systems
- Medical Imaging Systems
- Video Content Editing

INDUSTRIAL

- Industrial/Outdoor Access Points
- Workstations
- Machine Vision Cameras
- Compact Switches





NBASE-T ALLIANCE

Residential

HOME

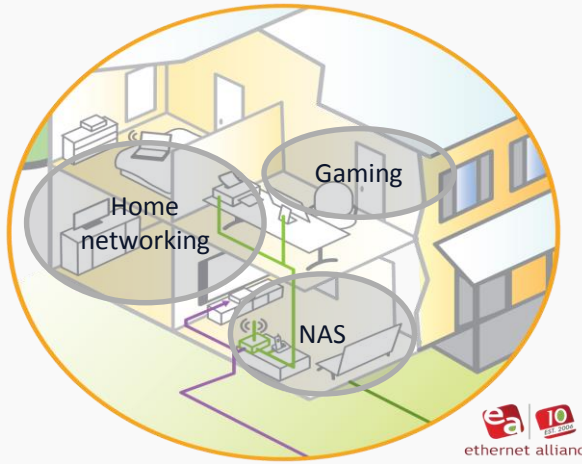
Access Points & Routers

Desktops, Notebooks

NAS

Gaming Computers

Small Cells



Multigig
Automotive?

Automotive Ethernet

Ethernet is being deployed in automobiles and will become the defacto standard for automobile networks by 2020. Because of requirements for lightweight autos, Ethernet was developed to deliver data and power over a single pair of wires to distances of 15 meters at 100Mb/s and 1Gb/s.

Power Over Data Lines (PodI)

PoDL delivers data and power to cameras, lights, entertainment systems, controls and other devices throughout the car.

Wireless Connectivity

Connected cars are expected to drive increased traffic to wireless networks that result in more wireless backhaul traffic over Ethernet.

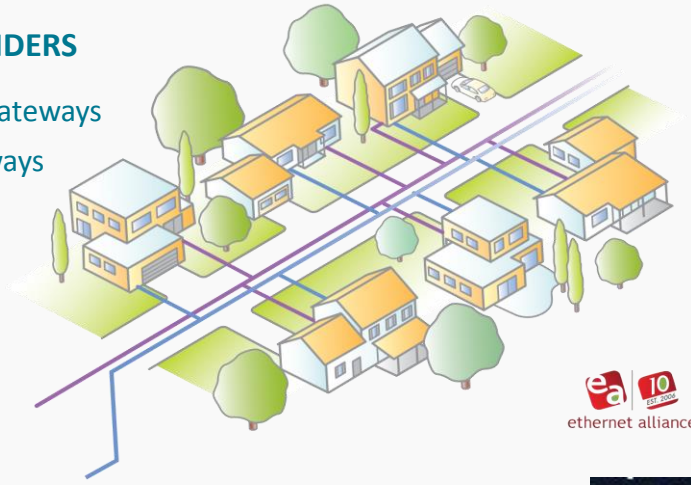
ethernet alliance

SERVICE PROVIDERS

DOCSIS Home Gateways

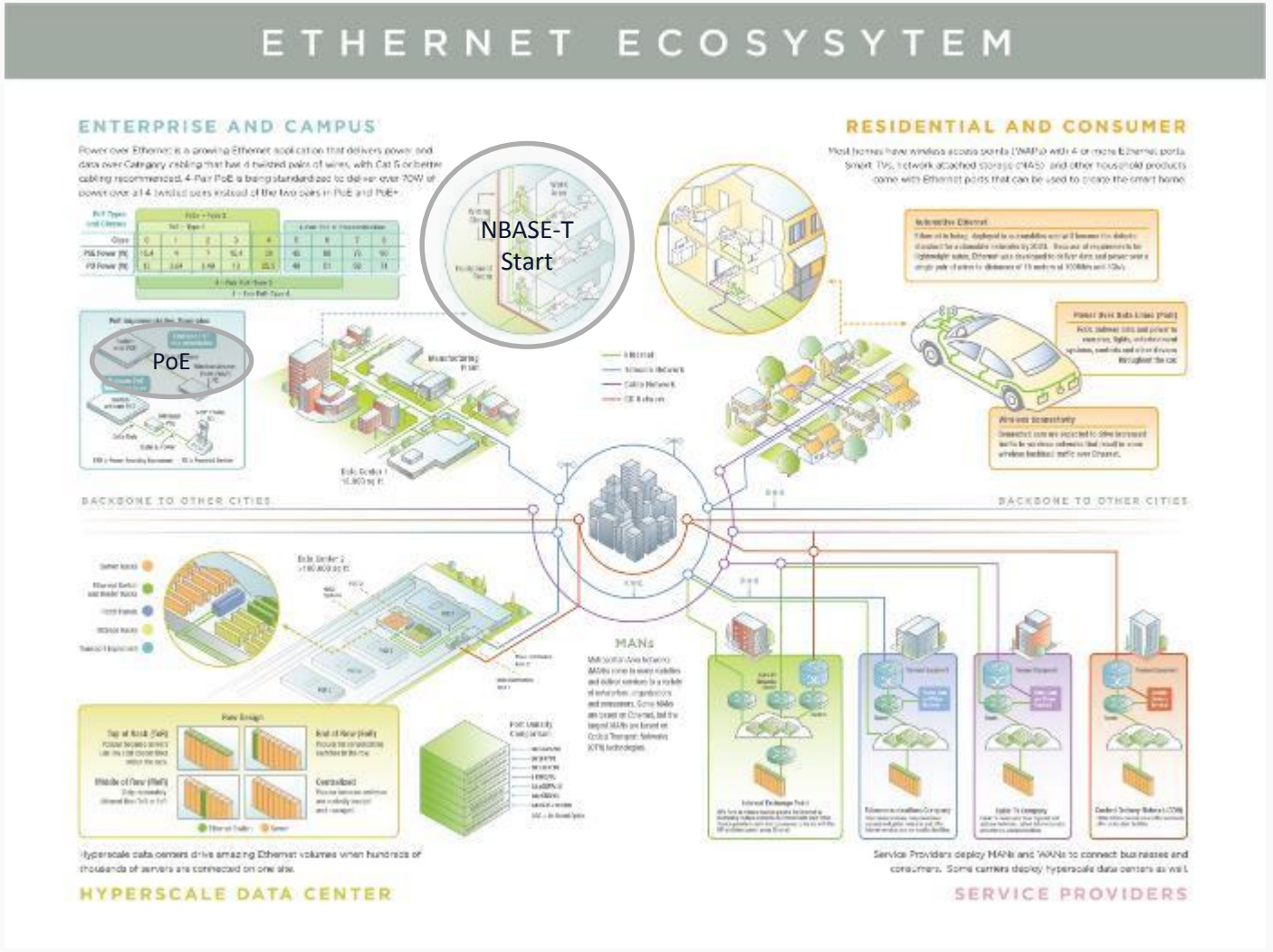
PON ONT Gateways

Small Cells



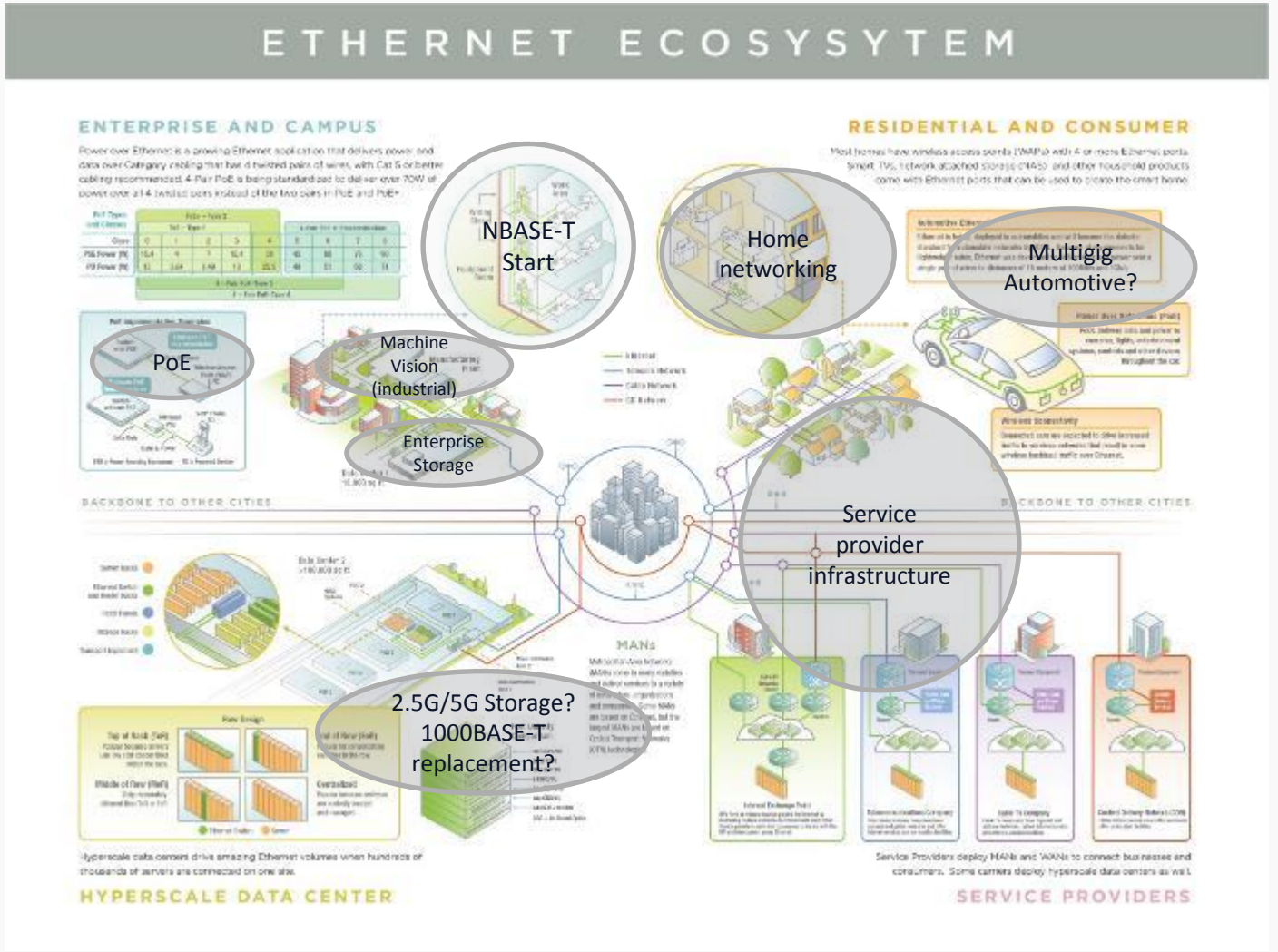
NBASE-T ALLIANCE

Filling out the Roadmap



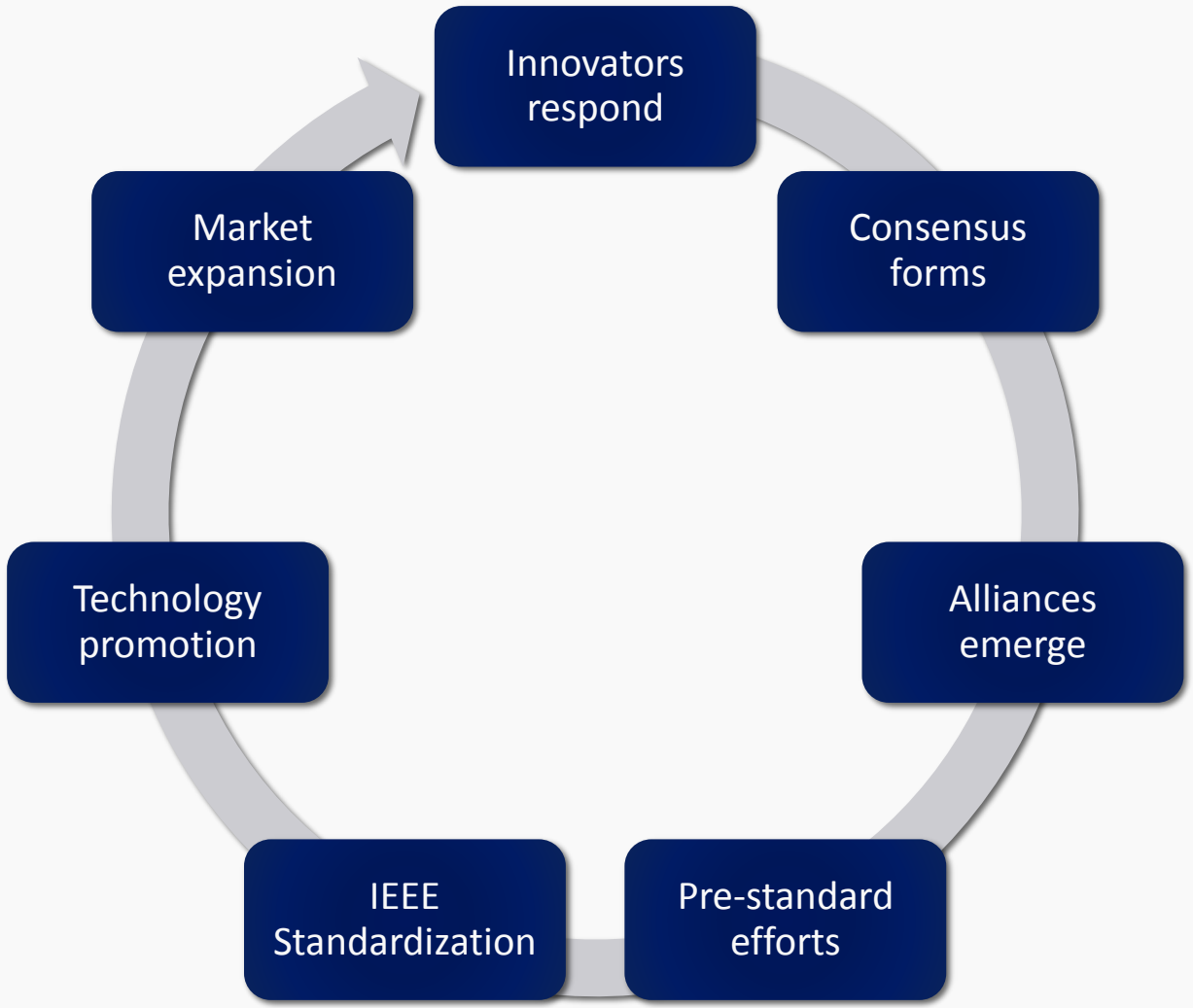
NBASE-T ALLIANCE

Filling out the Roadmap



NBASE-T ALLIANCE

Cooperatively driving the virtuous cycle…



THANK YOU

NBASE-T ALLIANCE™