

# NBASE-T Technology FAQ

## What is NBASE-T™ technology and why is it needed?

NBASE-T technology defines a new type of Ethernet signaling that boosts the speed of installed based twisted-pair cabling well beyond the cable's designed limit of 1 Gigabit per second (Gbps) for distances up to 100 meters. Capable of reaching 2.5 and 5 Gbps using the large installed base of Cat5e and Cat6 cabling, NBASE-T solutions enable users to accelerate their networks in the most cost-effective, least disruptive manner. Flexible silicon solutions can auto-negotiate the optimal network speed, be it the new NBASE-T rates, slower 100 Mbps and 1 Gbps rates, or—if the network infrastructure supports it—10 Gbps.

Due to the rapid growth of ever-more powerful mobile devices and richer content like HD video, networks are struggling to keep pace with rising bandwidth demands. Adoption of advanced wireless connectivity technologies, such as 802.11ac Wi-Fi, small cells and powerful workstations that handle large data files, means that network-access speeds must move beyond their designed limits of 1 Gigabit per second (Gbps) to 2.5 Gbps and 5 Gbps. NBASE-T technology supports these faster speeds without requiring a cable upgrade, thus economically meeting end-users' needs.

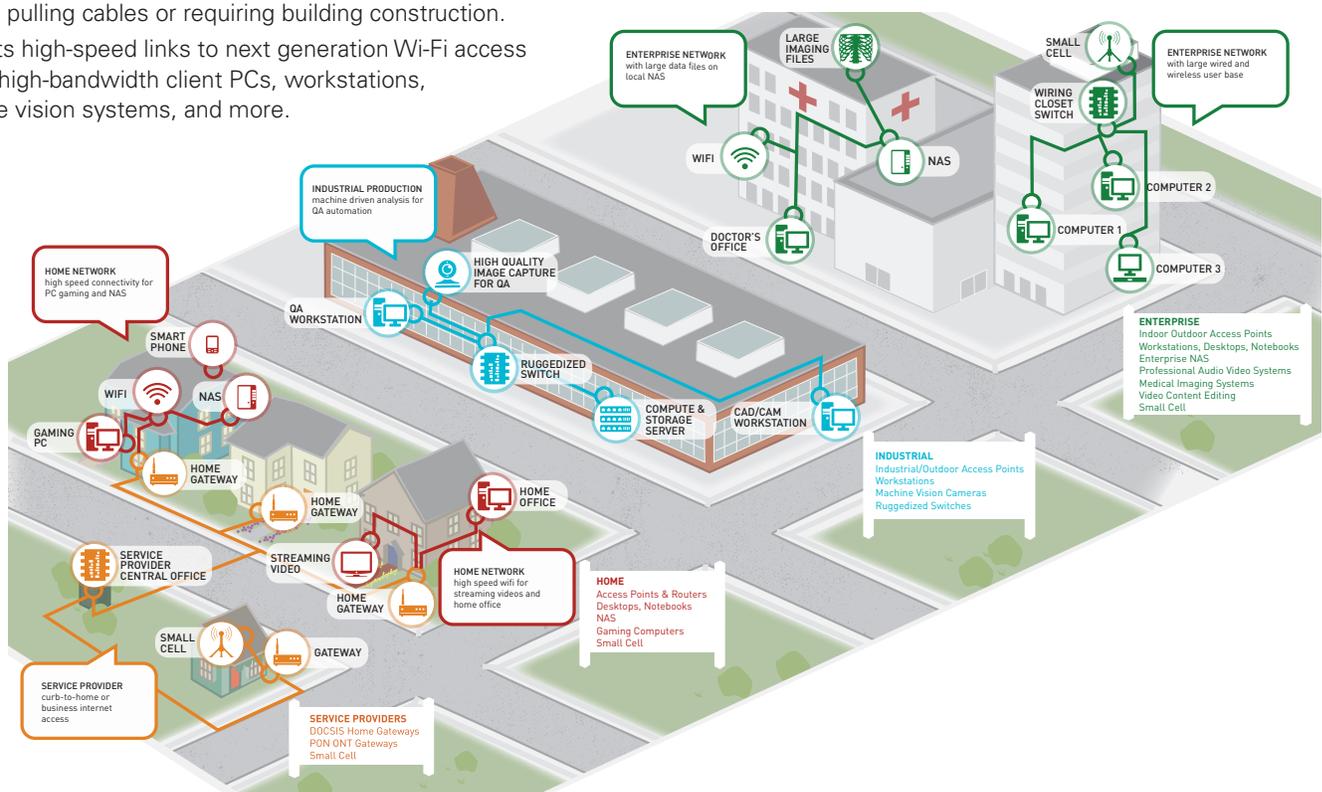
## What are the main values of NBASE-T technology?

- Leverages 70+ billion meters of Cat5e/Cat6 cables, 1.4+ billion outlets make up 90+ % of the installed bases.
- Enables network evolution by providing up to 10x faster speed without pulling cables or requiring building construction.
- Supports high-speed links to next generation Wi-Fi access points, high-bandwidth client PCs, workstations, machine vision systems, and more.

## What applications can benefit from NBASE-T technology?

An initial impetus for NBASE-T technology was the new generation of 802.11ac Wave 2 devices that broke through the 1Gbps barrier imposed by 1000BASE-T. Content is getting richer by the day with the explosive growth of video content, cloud applications, VR, gaming, teleconferencing, etc. Consequently, users expect the bandwidth offered by networks to keep pace. The 802.11ax Wi-Fi 6 standard, emergence of broadband service exceeding 1Gbps and the growing power of PCs, workstations and storage systems to produce, store and consume content, makes the transition from 1Gbps to 2.5 and 5 Gbps an imperative for many users.

NBASE-T technology allows the migration to faster wireless access technologies and delivers faster content transfer speeds to many client systems in enterprise, industrial, home and service provider environments. The applications for the technology continue to expand in areas not originally even considered.



## How does NBASE-T technology impact the updating of cable infrastructure?

Upgrading the cable infrastructure requires replacing existing copper cabling with higher speed copper or fiber-optic cables. The cost of a cable upgrade is estimated to be \$300 per cable pull. A campus-wide upgrade could cost hundreds of thousands of dollars. Category 5e (Cat5e) or Category 6 (Cat6) copper cables represent close to 100% of the installed cable infrastructure in enterprises around the world. Wholesale replacement requires substantial installation costs, time, and invasive disruption to the physical infrastructure of any enterprise building. Cost estimates are billions of dollars worldwide. Running on already-installed cable, as well as supporting better cable in greenfield deployments, NBASE-T technology avoids cable-upgrade expenses, reducing total cost of ownership (TCO).

## Does NBASE-T support Power Over Ethernet?

NBASE-T technology supports all Power over Ethernet (PoE) standards, facilitating its use as a replacement for existing 1 Gbps networks and making it ideal for greenfield deployments. PoE is fundamental in enterprise deployments, as well as large-building infrastructures, such as airports, shopping malls and stadiums. As its name suggests, PoE provides power to remote systems via legacy Cat5e or Cat6 cables. Fiber-optic cable connections, for example, do not have PoE capabilities.

## What are the NBASE-T specifications?

The NBASE-T PHY interface specification supports 2.5 Gbps and 5 Gbps rates over 100m of Category 5e or better cabling with a bit error rate of less than  $10^{-12}$ . An associated MAC-PHY specification, USXGMII, facilitates system development by enabling simple multivendor interconnection of MAC and PHY components.

## Are the NBASE-T specifications and IEEE 802.3bz standard compatible?

Pre-standard NBASE-T PHYs have been software-upgraded to be compatible with the IEEE 802.3bz standard. The NBASE-T specification includes additional features, such as downshift, that further optimize networks based on the standard.

## What is the NBASE-T Downshift feature and why is it important?

Downshift is a feature of the NBASE-T specification not covered in the IEEE 802.3bz standard. It enhances the usability of the 2.5GBASE-T and 5GBASE-T technology by offering a way for the network systems to reliably select the best speed that the cabling plant can support. This feature allows link partners to choose a lower speed when the available cabling is not able to support the highest common denominator speed.

## Can NBASE-T products be purchased today?

Yes. system-level solutions, PHYs and other component products compatible with the NBASE-T specification are shipping.

## Who do I contact for more information about NBASE-T technology?

Contact [admin@ethernetalliance.org](mailto:admin@ethernetalliance.org) for more details.