

White Paper

How to manage IP under IEC 61375-2-5 applications

Version 2.0

Nov, 2022

Regarding IEC 61375-2-5

IEC61375-2-5 is an Ethernet based control system which will form the core communication technology of future highspeed trains, the pace of developing new highspeed train platforms is increasing, along with this the demands on the onboard network are also increasing to levels not seen before, this comes from more & more systems connected to the onboard Ethernet system, some of the systems include, surveillance systems, passenger information systems, Public address, seat reservation, and many more, existing train networks would not be able to fulfill these increasing demands.

The IEC 61375-2-5 standard is released by the International Electrotechnical Commission (IEC). It defines the ETB (Ethernet Train Backbone) for Ethernet technology to follow on train network applications.

What is TTDP?

Train Topology Discovery Protocol, also known as TTDP, is designed for changing train configurations. When train cars are re-arranged in order, the IP of the Ethernet switches in the train car will also change. An ETBN (Ethernet Train Backbone Network) switch with TTDP function will re-arrange the IP address and Gateway IP when the train network topology is changed due to train car re-arrangement.

Limitations of TTDP

TTDP can only manage the IP assignment of the Ethernet switches and cannot manage the devices connected to the switches. Thus, when the train cars are re-arranged, **TTDP can only change the IP addresses of the switches without changing the IP addresses of connected devices e.g. CCTV cameras, passenger displays etc.** Under the Ethernet structure, the IP addresses of these devices should be managed by the DHCP protocol. That's why Lantech have developed DHCP for TTDP.

DHCP for TTDP for device IP management

Under the DHCP standard, a DHCP server has to build a DHCP Pool for assigning the IP address for its DHCP clients and each DHCP client can get its IP address within this Pool. The IP address of the DHCP server must be fixed and be under the same network segment with the DHCP Pool since the DHCP protocol is designed for communication between client and server via broadcast packets. The TTDP standard only manages the switch's IP address. The TTDP doesn't assign IP addresses of the devices connected to the switch.

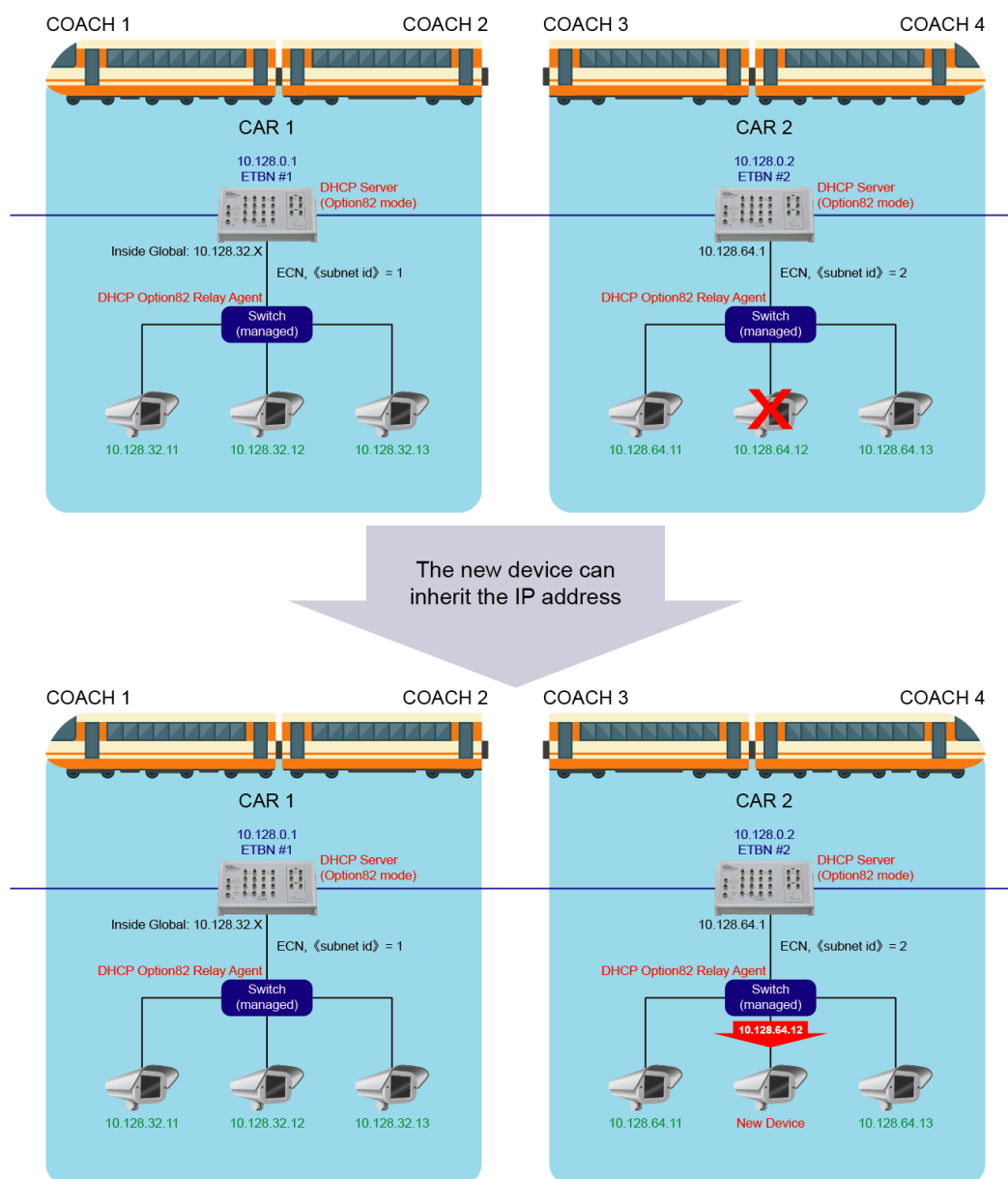


Figure 1 – DHCP for TTDP topology, when a broken device is replaced, the new device can inherit the IP address

With Lantech’s DHCP for TTDP technology, when the IP address of the Ethernet switch is re-assigned by TTDP due to train car changes, the Ethernet switch will reserve a new IP address automatically and compile a new DHCP Pool for its DHCP clients. This technology ensures the DHCP client can connect to the new ECN (Ethernet Consist Network) network via IP. Lantech’s DHCP for TTDP technology can also be combined with Port based DHCP or DHCP Option 82, which means, if the end device connected to the Ethernet switch needs to be replaced, the new device can inherit the IP address assigned by simply connecting it to the same Ethernet switch port.

When two train cars are re-arranged in order, the Ethernet switch will calculate automatically and assign the domain by the order of TTDP after the Ethernet switch is rebooted.

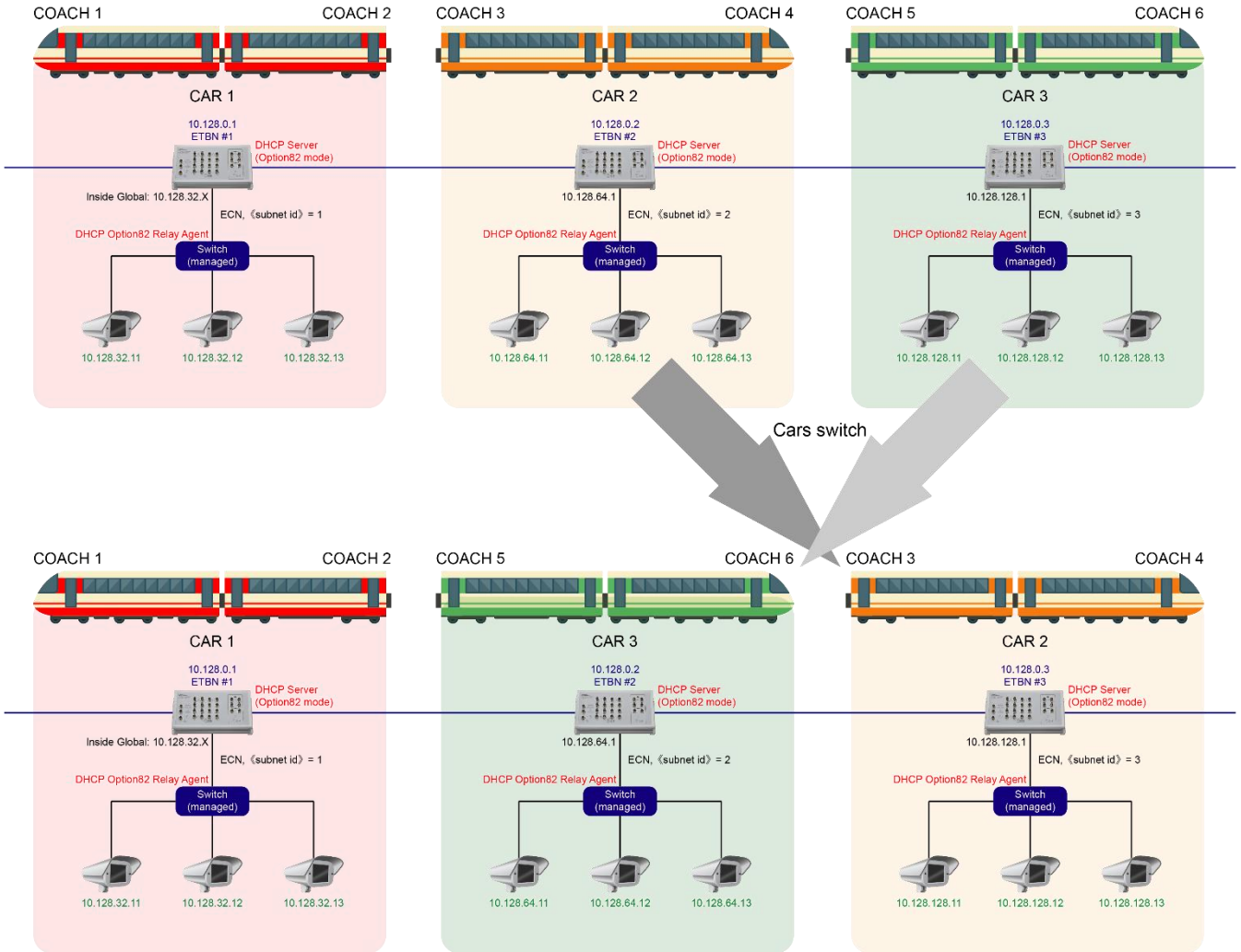








Figure 2 – DHCP for TTDP topology, when two train cars are re-arranged in order, the Ethernet switch & devices on the each car will be assigned an IP address by car's order automatically

Recommended Lantech IEC 61375-2-5 Ethernet Switch Models

		
<p>T(P)GS-R6804XT 4 x 1G/2.5G + 8 x 10G Copper, EN50155 IEC 61375 (PoE) Ethernet Switch</p>	<p>T(P)GS-R6616XT 16 x 10/100/1000T + 6 x 10G Copper, EN50155 IEC 61375 (PoE) Ethernet Switch</p>	<p>T(P)ES-L6424XFT 24 x 10/100TX + 2 x 10G Copper + 2 x 10G Q-ODC fiber, EN50155 IEC 61375 (PoE) Ethernet Switch</p>
		
<p>T(P)GS-L6416XT 16 x 10/100/1000T + 4 x 10G Copper, EN50155 IEC 61375 (PoE) Ethernet Switch</p>	<p>T(P)ES-L6416XT 16 x 10/100TX + 4 x 10G Copper, EN50155 IEC 61375 (PoE) Ethernet Switch</p>	<p>T(P)GS-L5408MGTA 8 x 10/100/1000T + 4 x 1G/2.5G Copper, EN50155 IEC 61375 (PoE) Ethernet Switch</p>

[View All Lantech IEC 61375-2-5 supported models](#)

About Lantech

Lantech Communications Global, Inc. is an IRIS & ITxPT certified manufacturer of Ethernet products focused on the transportation markets, bus, train, trackside, ITS, smart city and many more applications. Our range of onboard EN50155 & E-Marked Ethernet switches & wireless/ LTE routers offer cutting edge design and functionality. We continue to work with our key customers in creating further enhancements & developments in on board passenger information, video security, trackside data communications by providing rugged 10GbE, PoE managed Ethernet switches, LTE/Wi-Fi routers in line with ITxPT and E-Marked certifications for various applications and critical solutions.