

DoCAN Protocol

Introduction To DoCAN Protocol Tutorial

DoCAN is extending for the Diagnostic Over Control Area Network Protocol. This protocol is defined in the ISO-15765-2 standard. This ISO 15765-2 defines a transport protocol and network layer service. They both together adapted to meet the requirements of CAN-based vehicle network systems on CAN protocol as specified in ISO 11898-1. The DoCAN Protocol is mostly used in the automotive industry for vehicle diagnostic over the CAN protocol.

The diagnostic is a very important part of any kind of machine. Because if any problem will occur with a human or man, then he has thinking and decision making capability so that he can explain the problem to a doctor and take the medicine for cure. But in the case of a machine it is not possible, so to make this possible the software engineers should write multiple programs inside the machine that can do the same task as humans. So there are below protocols are being used to design a successful machine like a human.

It has been defined in accordance with the diagnostic services established in ISO 14229-1 and ISO 15031-5 but is not limited to use with them and is also compatible with most other communication needs for in-vehicle networks.

Need Of DoCAN Protocol

Automotive vehicles are now having a lot of complex features with autonomous driving capability. To handle these, day-by-day the vehicle manufacturers are adding more nodes or ECUs. So that more networking complexity occurs. To make it more flexible and durable with easy diagnostic, we need a world wide diagnostic standard protocol. So that everyone will follow the same standard. It helps us in diagnostic engineers, OEMs, and customers to fix the issues even if you are from any corner of this earth.

Now you might have thought that why DoCAN protocol? Yes, you can take any other protocol and it is possible in the future, like DoIP. But it is really high cost and other points that are not possible to implement it on all over the vehicle.

So for now the CAN is getting used in 60% of the vehicle all over the world. If you are trying to change a communication protocol, it is not that easy how you might have thought. Once a vehicle is released, it will be running for a minimum of 15 years on the road. So the protocol should support that much time. Since the CAN is now booming in most vehicles, obviously the diagnostic should support and that is why the DoCAN is a need.

Features Of DoCAN Protocol

The ISO 15765-2 provides the service to support different application layer Implementations. So that if you have a communication and a diagnostic protocol, then you can use it such as:

- Enhanced Vehicle Diagnostics:** emissions-related system diagnostics beyond legislated functionality, non-emissions-related system diagnostics.
- On-Board Diagnostics:** Emissions-related on-board diagnostics (OBD) that is specified in ISO 15031 standard.
- WWH-OBD:** The worldwide harmonized on-board diagnostics as specified in ISO 27145 standard.
- EOL-OBP:** End of life activation on on-board pyrotechnic devices defined in ISO 26021.

How Does DoCAN Protocol Works

The DoCAN protocol is a combination of some different layers of the protocol in the OSI layer. So that it is easy to follow a common standard for any kind of vehicle diagnostic. Even if no need to learn different protocols for different vehicles or OEMs. The name itself defines that diagnostic over Controller Area Network protocol. but to communicate with more data it also needs another Transport layer protocol. So the below protocols are required to design the DoCAN protocol for vehicle diagnostic.

- Communication Protocol:** CAN Protocol.
- Transport Protocol:** CAN-TP Protocol.
- Diagnostic Protocol:** UDS, OBD, etc.

Communication Protocol In DoCAN

The communication protocol is the physical layer having a physical wire connection for digital data bits transmission among the different ECUs. So here we are using CAN protocol by which the physical communication is getting done. The CAN is the main protocol for which the nodes or ECUs are able to communicate with each other. What data will get communicate is different. It depends upon the system requirement. So for now we are clear how really data communication is possible. We are clear why we need CAN ISO 11898-1 protocol.


Transport Protocol In DoCAN


The main question that might have to come to our mind that what is the need of transport protocol. We have CAN protocol that can transfer data, so again why? Yes but in CAN protocol, the sender can send only 8-bytes of data. If you will think about CAN-FD, then the maximum is 64-bytes. But in case of diagnostic communication, you need more data bytes need to be transmitted or received in between the ECU. To make it possible you need multi-frame format protocol. So that you can transfer more data packets easily by which the application layer will receive the total data packets.

Diagnostic Protocol In DoCAN

This is the main protocol for diagnostic. By using this protocol, a tester can send any diagnostic request with come command. So that the ECU nothing but a server can execute and send the response data with the result. Basically, the diagnostic protocol is nothing but having a lot of command services with a number of sub-functions. Each service having its own definition to do a particular diagnostic work. So that by using any diagnostic protocol we can do it. There are multiple diagnostic protocols in the automotive field. But we will take the example of the UDS protocol. So let us discuss how we can make the success of vehicle diagnostic using the above 3 protocols.



DoCAN Protocol Frame Format

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