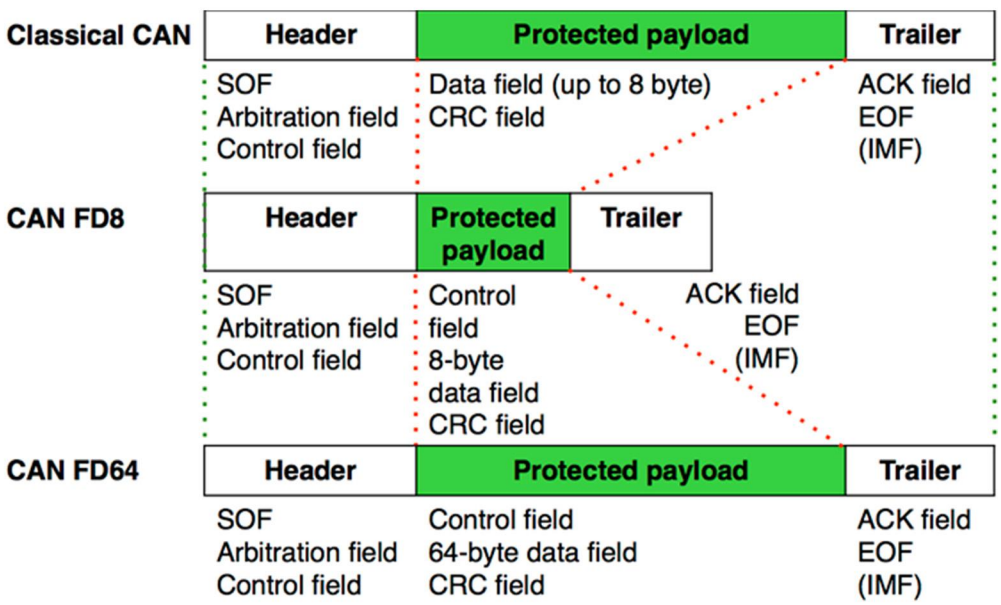
CLASSICAL CAN V/S CAN FD : FRAME ARCHITECTURE

Following diagram is the graphical comparison between the frame architecture of Classical CAN and CAN FD protocol



Source: CAN CIA Organisation

WHAT ARE THE ADVANTAGES OF CAN FD OVER CAN?

CAN FD protocol supports increased bandwidth for data communication across the automotive ECUs within a vehicle network. The following are some of the benefits of using CAN FD protocol over the legacy CAN-BUS protocol.

1 IMPROVED DATA RATE

The Classical CAN protocol allows the bandwidth of 1 Mbit/s whereas CAN FD protocol supports bandwidth more than 8 Mbit/s.

2 SUPPORT FOR LARGER PAYLOADS (DATA)

- CAN FD supports up to 64 bytes of data field as compared to Classical CAN that supports up to 8 bytes of data
- Due to high bandwidth capacity and larger payload (data field), CAN FD stack doesn't require transport layer protocol for enabling the in-vehicle network communication among ECUs
- During ECU re-programming, the speed of data transmission (data of sizes larger than 8 bytes) is significantly higher in a CAN FD network as compared to classical CAN.
- Thus the end-of-line software upgrade can be done more efficiently, that translates into time and cost savings

3 IMPROVED REAL-TIME DATA TRANSFER

During in-vehicle ECU communications, a single message (or data signal) is transferred as multiple independent packets.

Since CAN FD supports 8 times more data volume than Classical CAN, the transfer rates are faster and signal fidelity is better due to simpler packet management

All these factors play a significant role while developing real-time data transfer applications

4 DATA SECURITY

The data security parameter in CAN FD remains the same as that of the classical CAN despite the increased data packet size.

This is achieved by using longer CRC check keys with adapted algorithms.

5 BACKWARD COMPATIBILITY

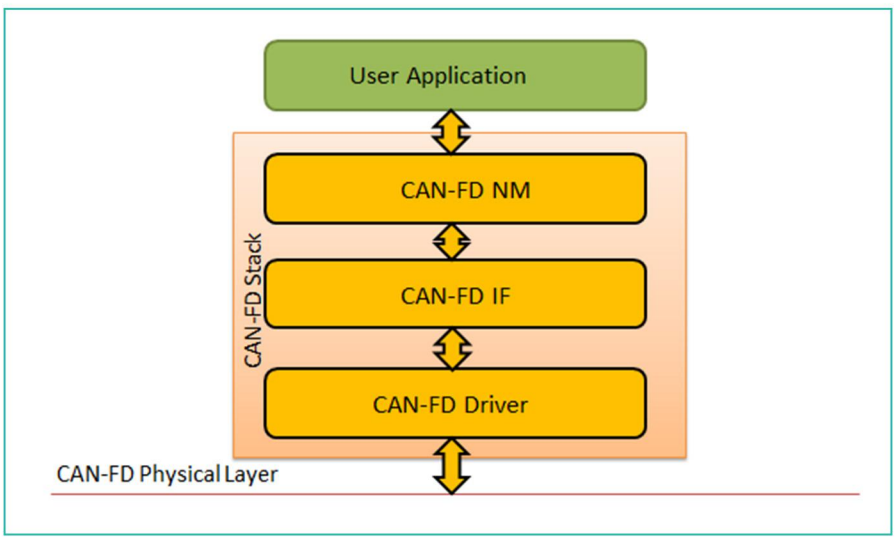
The CAN FD controllers can be used as classical CAN nodes as well. Hence the legacy network nodes can be gradually replaced with CAN FD-capable devices.

When the entire network becomes CAN FD complaint, then the advantages of this next generation CAN are realized to the fullest extent

THE ARCHITECTURE OF CAN FD SOFTWARE STACK

We have designed and developed a CAN FD software stack which is similar to CAN bus. The CAN FD stack can be integrated with your applications to help reduce time-to-market for the product development.

Our pre-packaged and off the shelf stack is effective in saving the development time and helps the OEMs to focus on product development.



The software layers of the CAN FD stack support following functionalities:

1 CAN FD DRIVER

This layer is created to enable the physical layer interaction with the higher layers of the stack. It helps in the abstraction of the transmitting and receiving of data from the ECU hardware.

2 CAN FD INTERFACE LAYER

This layer helps in the routing of the Bus channel regardless of its location. CAN FD Interface help in the abstraction of the driver from the higher layers because the higher application layers only interact with the channels and not the ECUs.

CAN FD interface layer also ensure hardware independence thus ensuring reusability of this stack across platforms.

4 CAN FD NETWORK LAYER

The network BUS transitions between various modes of operation cycles namely bus-off or sleep mode, active and inactive mode.

Network management layer sends a notification to the application layer about the status of the CAN BUS to the vehicle application layer.

The Tx and Rx messages between the NM layer and the user application are configured to achieve the same.

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