**J1939 INTRODUCTION**

1.What is J1939?

J1939 is a set of standards defined by [SAE](http://www.sae.org/) and is a high layered protocol using Extended CAN 2.O B(29 bit msg id).ISO 11519. It provides serial data communications between microprocessors.

2.What is High Layer protocol?

* A HLP is required to enable the communication across large complex n/w’s of vehicle manufactures.
* It handles multi-packet msgs i.e., when data larger than 8 bytes need to be transfered and it specifies how data is to be converted into human redable data.

3.What HLP will do?

* Start-up behaviour.
* How to distribute msg id among diff nodes in a system.
* How to translate contents of data frames.
* Status reporting within the system.

4.why it came instead of CAN?

* It can transmit single and multiple frame messages
* It using PDU format for detemining whether msg can be txtd with a dstn address or

if msg can be txtd as broad msg.(it can transfer data in peer-peer or broadcast methods).

* It is used for communicating b/w nodes as well as for diagnostic.
* It can transfer data more than 8bytes.
* It works on presentation,session,transport,N/W,datalink layers.
* It is software been used on CAN 2.O B.

5.what are they before J1939?

* J1705 and J1587 protocols are there.They operates at 9600 bits/sand can transmit max data of 21 byte msgs.

6.where it is going...next?

* Today, we see massive growth in [IoT](https://en.wikipedia.org/wiki/Internet_of_things) (Internet of Things) and '[connected mobility](https://www.bcg.com/publications/2017/connected-vehicles-road-revenue.aspx?_lrsc=21958e5c-04e1-4e1d-8218-fba6018a2e4d&source=Elevate&medium=LinkedIn)' will be a huge market.This will be enabled via scalable fleet solutions using [affordable WiFi data loggers](https://www.csselectronics.com/screen/page/wifi-can-bus-obd2-j1939-analyzer-canlogger3000), but the heart of such applications will remain the SAE J1939 protocol.

7.Features of J1939?

* Operates at speed of 500 kbits/s
* max n/w length of 40m
* supports n/w management(includes node ID & msg ID)
* Max no.of bytes per multi-packet msg is 1785 bytes.
* Max no. of nodes in a n/w is 30.(ECU’s).
* In BAM(Broadcast Announce Msg) type,Time b/w msgs is 50-200 ms
* Able to diagnose
* Fleet management is also associated with IoT, and transportation is known as one of the fastest growing markets for IoT.

8.Applications of J1939?

* [Foresting machinery](https://en.wikipedia.org/wiki/ISO_11783) (e.g. delimbers, forwarders, skidders, ...)
* Mining vehicles (e.g. bulldozers, draglines, excavators, …)
* [Military](https://en.wikipedia.org/wiki/MilCAN) vehicles (e.g. tanks, transport vehicles, …)
* [Agriculture](https://en.wikipedia.org/wiki/ISO_11783) (e.g. tractors, harvesters, …)
* Construction (e.g. mobile hydraulics, cranes, …)
* Fire & Rescue (e.g. ambulances, fire trucks, …)
* Other (e.g. [ships](https://en.wikipedia.org/wiki/NMEA_2000), pumping, [e-buses](https://www.csselectronics.com/screen/page/cloud-battery-management-can-bus-bms), power generation, ...)

9.What is Parameter Group Number?

A PGN acts as a unique ID for looking up the function of J1939 msg and associated data parameter(SPN).

10.Structure of 29 bit identifier?

| Priority | Reserved | Data page | PDU format | PDU specific | Source Address |
| --- | --- | --- | --- | --- | --- |
| 3 bits | 1 bit | 1 bit | 8 bits | 8 bits | 8 bits |

11.How we are using?

12.What is an SPN?

* Each parameter used in the J1939 network is described by the standard.
* A Suspect Parameter Number (SPN) is a number that has been assigned by the SAE committee to a specific parameter.
* Each SPN has the following detailed information associated with it: data length (in bytes); data type; resolution, offset; range; and a tag (label) for reference.
* SPNs that share common characteristics will be grouped into a Parameter Group (PG) and will be transmitted to the network using the same PGN.