

# UDS Protocol



## **CASE STUDY UDS PROTOCOL CLIENT - JOHN DEERE**



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Aurelius



## **U.D.S Protocol training Delivered to Client** **John Deere**

**Client: John Deere**

**Industry: Automotive and industrial equipment**  
**manufacturing**

John Deere is the name of the brand of the American corporation Deere & Company which provides various products in agricultural equipment, construction equipment and forest machinery. As of 2014, Deere and Company employed over 67,000 personnel worldwide. The majority of their equipments are of agricultural machinery such as tractors, harvesters, cotton harvesters, balers, planters, seeders etc. They also provide construction equipment such as Loaders, Excavators, Tracked loaders and more. The company has its administrative centers in the Illinois region with the main Administrative Center in Moline, Illinois and the primary manufacturing centers in the southeastern and central United States. The company has also been working to develop electric farm tractors as of 2016.

With the recent advancements in digital technologies, the company has even started exploring the domains of machine learning as applied on agricultural practices by acquiring a California based company Blue River technology. They aim to enable growers to reduce the overall use of herbicides using computer



vision and machine learning technologies and thus optimizing the use of inputs in farming.

## **Technology: U.D.S protocol**

### **Domain: Communication and diagnostics**

Unified Diagnostic Services is a diagnostic communication protocol tool which can be integrated in the ECU of Automotive system electronics. The term unified essentially relate to the standardization of the communication protocols in the ECUs made by Tier1 suppliers of OEM equipments. The diagnostics tools contained in these control units installed in a vehicle contact with the various systems through enabled UDS services. This is in contrast to the CAN protocols which only provide the first and second layers of the OSI model. Through the UDS communication protocols the Service ID and the various parameters which are associated with the communication services are contained in the 8 data bytes of a message frame which is issued through the diagnostic tool. The UDS services utilize the fifth and seventh layers of the OSI model instead of the first and second layer of the model.

Most of the modern vehicles come with diagnostic interfaces in order to connect client systems or testers to the bus system of the UDS protocols. Through the UDS protocols a wide range of functions such as electronic fuel injection, engine control unit, transmission, anti-lock braking systems, door locks and the various other tasks and features of the vehicle systems.



## **Challenges Faced By the client:**

John Deere is currently one of the leading manufacturers of automotive equipments and machineries. Their fleet of vehicles provided for agricultural and construction purposes are extensively used throughout the industry and they are considered to be one of the best in their domain. With the increasing pace of technological change it was becoming extremely important that the client kept up with the changes and integrate the new technologies which could make the performance of their vehicles better than what they had at that stage.

Currently the client was using an older technology for their Electronic Computation Units to develop communication service between the various tasks and control units of the vehicle. This technology known as J1939 was effective till now but now they had better communication systems available in the industry which if implemented could possibly improve upon their vehicle's performance manifold. One of such systems rapidly becoming popular in the automotive market was the AUTOSAR system implemented over the Unified Diagnostic Services protocol.

Being a new technology they also needed expertise and a workforce trained in the tool to start implementing the protocol and communication system in their ECUs of the vehicles. The sophisticated nature of the technology also posed certain issues of implementation and thus extensive hands-on practical knowledge was required for effective implementation.

Their high production rates of vehicles also was a hurdle because the platform of the deployment of the UDS technology was to be developed in a manner which can match pace with the production rate and provide similar rate of development of the system and end-deployment. Consequently they required a complete model of development starting from technology integration to technology implementation.



## Why Aurelius

Over the past few years, Aurelius has become market leader in the development of learning solutions related to communication systems and communications protocols. With decades of global experience in communication systems technology brought in by the founders of the organization, it was deemed only beneficial that Aurelius was given the task to develop an effective learning solution which can deliver both theoretical knowledge and practical hands on practices to the client. The entire learning solution was structured from scratch by a dedicated team to include the very specific points which were the requirements of the client.

The major task was to integrate theory with practical exercises and this was done by developing a training platform which can be used to test the UDS Diagnostic technologies by the engineers of John Deere. It was a tough task to provide hardware setup at the client's location considering the immense computing power to test and deploy the diagnostic test cases. Nevertheless, Aurelius was able to provide the required hardware setups which was further used extensively by the John Deere engineers to test the various use case scenarios they built during the program tenure.

The program itself including both theory classes and practical hands on sessions was delivered through a Subject Matter Expert globally sourced having immense experience in the domain of UDS communication as applied in Automotive sector. The global experience of the SME was highly important because the client itself dealt globally through their products.

Aurelius provided complete on shore and off shore support to the client from the first call itself and further with post-completion support to the fullest extent. With Aurelius, John Deere gained the advantage of legacy integration and the extensive knowledge base of the global industry which has been developed by the company over the past decade. Aurelius was able to provide not just the technical know-



how of the tool but was also able to make their workforce industry ready. By the end of the learning program, each and every participant of the program was able to independently develop and test UDS communication systems over the platform developed by Aurelius.

## **Solution and Post Solutions Benefits**

The entire learning solution was delivered on the client's location itself through a five day program. The learning solution included extensive practical lab session under the guidance of the subject matter expert along with extensive query session and doubt solving sessions. Best efforts were made to connect the theory with the practical classes so that the participants don't loose sight of the fundamentals of the communication protocol which is especially important for troubleshooting procedures. The various best practices of dealing with the tool along with troubleshooting procedures were also explored extensively.

On the very day of the program completion, the John Deere engineers were ready to deploy and test UDS communication services over the client's manufactured vehicles. They can now start deploying UDS communication protocols over their vehicles very effectively through their own workforce without any external support. They can very easily gain their Return on Investment within six months since the learning program completion.