Nidec
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Project Summary

Project: Profinet IRT – EtherCAT Gateway for real-time processes
Application: A variety of high performance industrial applications

Nidec's Role

Nidec Industrial Solutions was charged with developing a communication gateway that enables older industrial equipment to dialogue instantaneously with new IoT technologies.

Scope of Suppy

• 1 – ARTICS- embedded PC
• 1 Hilscher card – EtherCAT Slave
• 1 Hilscher card – Profinet IRT Master
• Nidec Industrial Solutions Profinet IRT Slave
  – EtherCAT Master bridge software

Technology
• Nidec ARTICS-embedded PC System
• Nidec Control Techniques Unidrive II

The challenge:
To develop a high-speed gateway to exchange data between different communication standards, a key component of the transition to IoT

High performance automotive test benches and other real-time industrial applications depend on synchronized communication between automation master and slave equipment.

Slave equipment – typically drives – must exchange speed or torque set points and feedback instantaneously with a tolerance of just nanoseconds. They are typically based on an EtherCAT communication standard. Many automation master systems, however, are based on a different communication standard, such as Profinet IRT (Isochronous Real Time).

While some organizations implementing IoT technologies advocate replacing all control systems with components based on the same communication standard, many manufacturers prefer a phased transition in master-slave architecture. These companies are seeking an intermediary solution that allows safe, high-speed dialog between their new and old equipment.

To meet this need, Nidec Industrial Solutions aimed to develop a gateway that would allow data to be exchanged instantly and safely between two communication standards.

The solution:
The Profinet IRT – EtherCAT Gateway for real time processes

Profinet IRT Master is used to synchronize communication between master and slaves, while Distributed Clock fulfills the same function in the EtherCAT protocol.

Nidec's solution, the Profinet IRT – EtherCAT Gateway, allows Profinet IRT Masters to exchange data with Control Techniques drives based on EtherCAT slave communication. With this solution, the round trip time (RTT) – the time needed to send the set point and receive the feedback – is as short as 500 µs.

The bridge consists of a PC embedded with Nidec's ARTICS management system, Profinet and EtherCAT interfaces, and bridge software that assures the data exchange between an industrial PLC and the Nidec Control Techniques Unidrive II with a 250 µs cycle time.

This same gateway can be used to interface multiple protocols, including Ethernet/IP and Modbus TCP. Others are available upon request.