ABSTRACT / MOTIVATION
The computing power embedded into modern sensors and actuators enables the substantial improvements of sensing methods and properties, but such devices can provide numerous additional features. In particular, the intelligent sensors provide a range of configuration and diagnostic capabilities. The real challenge is, how users can access all these features in a user-friendly, convenient way in the so-called “Internet of Things” (IoT).

SMART SENSORS
As mentioned, modern, intelligent sensors can provide beside the primary sensing signal numerous additional information:
• relevant environmental parameters (temperature, pressure, rel. humidity, load etc.)
• self- and application-related diagnostic data
• statistical characteristics of the sensing signal information
These additional features provide information about the current state of the automation system (metadata).

Beside the standard communication methods, the ease of integration can be further supported by the application of other widely used data representation techniques, such as XML, and JSON.

With all of these methods, we achieved undisturbed communication of the high-priority control task, while the metadata was transferred and accessed by the user simultaneously via standardized ways, without the installation of any additional communication networks.

SYSTEM INTEGRATION WITH IO-LINK
The IO-Link interface collects the information from the sensors at the bottom level. The upper level of the system operates with different industrial Ethernet-based field busses using the same physical layer as a common home internet connection. The gap between IO-Link and Ethernet is bridged by the so-called gateway functionality, integrated in the fieldbus device.

INTEGRATION WITH IoT
The data representation of IO-Link is mapped by the gateways to an IP-based protocol to make it accessible for the IoT.
Higher level applications — cloud services, production monitoring system etc. — can access these information with protocols such as UDP, HTTP, or OPC-UA.

CONCLUSION
Our concept was to transport the IoT approach into the industrial context, and to improve effectiveness and productivity using the metadata acquired over the factory area network. The demonstrated solution provides an efficient development platform for factory automation with high production availability, proactive maintenance and real-time production statistics.