

# Master-IT: Project work WS2010/2011

**Area: Industrial Communication**

## Identification of Real-time Ethernet Traffic Streams

start: Immediately  
partner: Consortium EU Project „flexWARE – Flexible Wireless Automation in Real-time Environments“

### Description

Real-time Ethernet Networks (RTEs) have emerged as the preferred solution for networked control systems in factory and process automation. Due to their advantages, in terms of cost and mobility, wireless technologies such as IEEE 802.11 could be used to extend wired RTEs. However, wireless communication standards that offer mechanisms to provide QoS require detailed knowledge about the real-time traffic streams. Such knowledge is usually not readily available.

One way to find out the needed information is to use a priori knowledge about the system. However this task may prove difficult because there are many different RTEs and the data needed may not be provided by the fieldbus vendors. Also, inspection devices that may be able to inspect and interpret fieldbus frames during establishment of connection relationships could be used. However this approach is also not optimal due to added costs and the fact that different fieldbus protocols may have proprietary frame formats (specific fields in connection relationship frames), which means that a database with properties of all RTEs would be needed. Additionally, whenever a RTE protocol has been slightly changed (due to a new version becoming available) the RTE database would also have to be updated. Interpretation based on the traffic flow statistics and standard Ethernet headers is more reliable. A method combining frame inspection (standard Ethernet information) and traffic behavior (timing statistics), may be a better alternative to the aforementioned approaches.

### Goals

Develop portable embedded code that can be deployed on different platforms. The pcap library for Unix or Windows based systems may be leveraged. The identification engine will use the following inputs: Ethertype, MAC Address, frame length, Interarrival time, arrival times, etc. As a possible output, it could deliver the following or something similar:

- number of nodes
- number of flows in each node
- length (including overhead)

- send cycle
- -priority and protocol (fieldbus)

### References

- [1] IEEE Std. 802.11-2007, "IEEE Standard for Information technology-Telecommunications and information exchange between systems-Local and metropolitan area networks-Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications," June 2007.