Giotto/TDL on top of a Time-Triggered Architechture

Johannes Pletzer

yohap@yohap.com

Proposed Thesis Subject:

The purpose of the thesis is to integrate the Timing Definition Language (TDL) with the Time-Triggered Protocol (TTP) for the development of fault-tolerant distributed real-time systems. TDL is a language for the definition of real-time systems that aims at a separation of the timing and the functionality of real-time applications. TTP is a communication protocol based on the ideas of the Time-Triggered Architecture and is intended for highly dependable distributed real-time systems. The goal of the integration was to show that it is possible to implement an application written with TDL on the TTP platform with special focus on distribution and fault-tolerance aspects.

For the purpose of the integration of TDL and TTP development tools a whole toolchain was developed and implemented. The core of it is a plugin for the existing TDL compiler that handles the transformation of TDL code to finally get executable binaries for the TTP platform. This required a detailed analysis of how to map the TDL constructs to the TTP tools. In order to support fault-tolerance and distribution, additional specification was provided in a separate file.

The theoretical work was put into practice by means of a simple demo application that used the developed toolchain and incorporated distribution and fault-tolerance features. As hardware platform a TTP cluster provided by TTTech was used. The results showed the feasibility of the ideas behind the plugin and proved that it works for simple applications.

The thesis will be finished by the end of August 2004