

CHALMERS

Switched Real-Time Ethernet for Industrial Applications

Hoai Hoang

Licentiate seminar will be held in Halmstad University, Wigforssalen,
Kristian IV:s väg, Halmstad on the 27th May, 2003 at 13:15

The thesis is available at:

The department of Computer Engineering, Chalmers University of
Technology or The School of Information Science, Computer and
Electrical Engineering, Halmstad University



Department of Computer
Engineering
School of Computer Science and
Engineering

CHALMERS UNIVERSITY OF
TECHNOLOGY
412 96 Göteborg
Tel: 031-7721000



School of Information Science,
Computer and Electrical
Engineering

HALMSTAD UNIVERSITY
301 18 Halmstad
Tel: 035-167100

Switched Real-Time Ethernet for Industrial Applications

HOAI HOANG

School of Information Science, Computer and Electrical Engineering, Halmstad University.

Department of Computer Engineering, Chalmers University of Technology

Thesis for the degree of Licentiate of Engineering

Abstract

The research reported in this thesis has been focused on developing and analyzing how to support real-time traffic over a switched Ethernet network without any hardware or protocol modifications. The work has resulted in a proposed systems model, supporting both real-time and non real-time traffic. Currently this model is intended for a one-switch network, with no shared media. All added traffic handling to support real-time communication is positioned in a thin layer (RT layer) added between the Ethernet layer and the TCP/IP suite. This assures adaptation to the surrounding protocol standards. The RT layer manages traffic on the basis of virtual connections, denoted as RT channels, as well as packet level scheduling. RT channels are created between end-nodes prior to any occurrence of real-time traffic. Asymmetric deadline partitioning between the links of the RT channels is also proposed, in order to increase the number of possible RT channels.

Keywords: Switched Ethernet, Real-time communication, EDF scheduling, Industrial networks.