

# Scaleable Intelligent Video Server System

<i>Title</i>	<b>Simula Switch Feasibility and Research Contribution Report – Complementaries FORTH &amp; Simula</b>
<i>Revision</i>	B
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<i>Dissemination<sup>†</sup></i>	<b>PU</b>

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A	2005-12-12	Created by ITT
Note-1	2006-08-03	Created by JFU
Note1 Rev B	2007-03-14	Updated by Thomas Sørdring and classified as PU

<sup>†</sup> **CO** = Confidential (only for members of the consortium + EC); **RE** = Restricted to a stated circulation list (+ EC)  
[replace this footnote with the list]; **PP** = Restricted to other FP6 participants (+ EC); **PU** = Public

## 1 SUMMARY

This document is a note comprising the inputs from FORTH and Simula to clarify the following comment from the Audit Report:

*"The complementarities of FORTH and Simula research activities should be better clarified."*

Further after the final review in Havant in February 07, the auditors asked that D5.3 Note A be updated to remove the discussion style presentation.

*"D5.3 should be structured and formatted properly"*

The research efforts of both Simula and FORTH were directed towards supporting the original SIVSS architecture and must be viewed from that perspective. Simula created research plans for the 2 year timeframe that we participated in SIVSS.

Within WP5 Simula have studied and proposed novel solutions relating to issues of an Advanced Switching fabric that could be used in a high-performance network like SIVSS. In particular we have studied:

- QoS issues relating to high-performance networks
- Congestion Management and QoS using a resilience algorithm
- Fabric Management issues required by an ASI fabric
- Routing strategies in a network that SIVSS would have been likely to employ
- Deadlock issues in a network that SIVSS would have been likely to employ
- The development of a simulation model showing a MIN network capable of delivering 1 T bps.

All these issues are inter-switch issues.

FORTHs research in WP5 focused on the performance of the TeraChannel (TC) switch: FORTH evaluated the TC switch performance, verified its capabilities to provide real-time service guarantees, and developed and optimized the buffered crossbar architecture by reducing the SRAM buffer size. They also built a hardware prototype platform and used it to (a) validate the buffered crossbar architecture, and (b) provide the network endpoint functionality needed for the software prototyping and measurements that were used in WP9.

The research efforts of both FORTH and Simula do not overlap and complement each other through their role within a fabric. FORTHs efforts are local examining functionality within a single switch, while Simula looks at the global picture within the fabric.

In summary FORTHs contribution lies in the development of novel switching architectures of a single switch, one can argue they looked at the *intra-switch* issues while Simula has contributed by analyzing interconnect issues when multiple switches are inter-linked in a fabric (as described above), i.e. they looked at the *inter-switch* issues.

From Simula's point of view D5.3 has been very successful with two very high-profile publication in the July issue IEEE Communication Magazine. Both publications were directly attributed to SIVSS and EU funding.

INTERCONNECT AND  
FABRIC TECHNOLOGY STANDARDS

## An Overview of QoS Capabilities in InfiniBand, Advanced Switching Interconnect, and Ethernet

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**ABSTRACT**

A recent trend in interconnection network technologies is the inclusion of various mechanisms to support a variety of quality of service (QoS) concepts. This has been necessitated by an increasing number of application areas that require some level of performance guarantees from the network for parts of its traffic. In this article we describe and compare the capabilities and support for the QoS of three of the most important interconnection network technology standards of today. Equalities between the technologies are explained and differences are clarified.

**INTRODUCTION**

Research into the quality of service (QoS) in interconnection networks has gone through several phases. Two decades ago interconnection networks with point-to-point links were mainly used in massively parallel processors undertaking scientific calculations. At that time the interconnection network was considered a bottleneck in the computation and therefore most of the research and development effort focused on improving overall performance, while differentiation between different classes of traffic did not receive noteworthy attention. This resulted in rapid increases in interconnection performance and when new application areas related to multi-media and other real-time applications came along, the bandwidth of the interconnection network was widely believed to be abundant. Taking special measures to control the QoS was therefore considered unnecessary. It was not until the late 1990s that this view changed in a profound way, and at present there is an expectation that QoS-controlling mechanisms are part of any general-purpose interconnection standard.

When discussing QoS in interconnection networks, there are three properties of significant importance: bandwidth, latency, and packet loss. The granularity of the object on which these metrics are applied are single data streams, classes of traffic, or all-network traffic. In most


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