# System-on-Chip Approach to High Performance Audio Signal Processing and Transport

Ilya Dmitrichenko

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### Abstract

*Looking at recent innovative products for general and application-specific embedded computing, majority is Systems-on-Chip, some integrate a greater deal of peripherals and most are low-coast and low-power; not to mention rapid improvements of various performance factors. However it turns out that in audio application area there are fewer innovative dedvices and most of the vendors in the field apply proproetary technologies. On large, these are featuring an FPGA along with system control computer and separate peripheral controllers.*

*Most of interesting SoC devices on the market, dominated by ARM cores, rather rearly include high performance FPU. Some icorporate GPUs. There are ways of using GPU for many types of signal processing applications, however not many had yet been found particularly versetile for audio. This may be an interesting subject, though the purpose of this project is to bring yet another platrform, the primary deployment area of which has somewhat different nature of requirements. For flexibility and other architectural reasons, porpular x86 family is not being considered. Although multiple other alternatives are to be studied and discussed.*

This project aims at developing a suitable hardware closely coupled with high-level software framework to facilitate research in the field of distributed audio processing and control, also capable to incorporate real-time network streaming and data storage, applying latest technology standards. During the primary phase the main interest is to implement a platform using open-source software and hardware, with major orientation into the second, utilsing OpenSPARC architecture. OpenSPARC provides multi-core general-porpouse high performance host processor and by being open-source it can be greatly extended to provide a configurable datapath pipeline with semi-fixed audio function units. It also features network and storage iterface controllers, therefore in later phase technologies such as Audio Video Bridging can be integrated to build a distributed system with multiple nodes of different function classes.

Additional issues to be addressed in the project to certain extend, would be in the area of multi-threaded and multi-application host audio processes. Hardware framework would provide facilities to accellerate signal processing

elements, which traditionally had been handled by software. The configurable datapath with semi-fixed function blocks is to represent ...