

VISION STATEMENT FOR UK MICROELECTRONIC DESIGN RESEARCH

AN OPEN PLATFORM FOR PROGRAMMABLE LOGIC

Introduction

The theme of the programme is to develop a standard platform for programmable systems supported by an open source EDA tool set. The objective is to escape from the constraints of proprietary architectures and to encourage the development of advanced algorithms for reconfigurable systems.

Impact on academic research and industry

Programmable logic has played an increasingly important role in electronic system design over the past five years. It has become cost effective for use in place of ASIC devices in original manufacture and the in-service upgrade of systems via software downloads has become commonplace. The next step forward will be to develop system architectures making full use of dynamic reconfiguration and evolutionary algorithms. The techniques have the promise of enabling lower system costs at the point of manufacture and lower in-service cost with the ability of systems to respond to mechanical wear or even partial failure.

The incumbent FPGA vendors are constraining the development of new programmable architectures because it is not in their interest to support a line of research that would ultimately result in lower component piece part costs. The constraints exist within the silicon architectures employed and behind a closed barrier of proprietary EDA tools.

It is vital to the future health of electronics system design in the UK that our universities take a leadership role in the development of advanced programmable architectures algorithms and techniques.

STMicroelectronics has launched an open source programmable logic programme called GOSPL. The associated document "About GOSPL" gives details, but in essence STMicroelectronics is making freely available the greater part of one million lines of source code being the complete EDA toolset for a new programmable logic architecture implemented in 90nm silicon. ST is providing support and encouragement to universities to use and develop this software in line with their research interests. An independent Advisory Council started meeting and universities are also invited to create and join technical committees to drive the programme forward.

GOSPL has been launched as a world wide initiative and ST makes no apology for that. However ST has a strong presence in the UK and ST's FPGA research programme is managed from Marlow. Now is the time for UK universities, the EPSRC and the DTI to act to ensure that the UK plays a leading role in the evolution of the GOSPL programme.

Criteria for success or failure

The ultimate measure of success will be that GOSPL becomes the industry standard platform for programmable logic and more GOSPL based products are produced world wide than competing proprietary offerings.

Support from the microelectronic research community

The presence of wide support is beyond question. At a recent conference in New Delhi, when GOSPL was first introduced to the world, one third of the delegates present applied on the spot to join technical committees.

Appeal to the general public

The average person would probably not be that excited by GOSPL except that everyone appreciates their consumer products being cheaper, more flexible and capable of being updated with new services and features. (Note this is counter to the interests of equipment manufacturers who want consumers to throw away perfectly good items to replace them with

the latest model. But it is good for the environment and very good for the third world/emerging economies.) Having said that, it may be possible for companies to use GOSPL as a marketing tool in the same way as fuzzy logic is used for domestic appliances. GOSPL will appeal to schools and colleges and ST is actively developing textbooks and other support material for teaching.

Benefits to academia, industry and society

GOSPL is an open collaborative venture bringing together academia, industry and venture capital. A strong UK university research programme in programmable logic will produce a pool of experienced engineers who can start up their own enterprises or move on into industry. Their links with the universities will be maintained because in their industrial environment they will use the same software tools and IP they worked on and developed while at university.

International scope

The GOSPL programme is fully international. The Advisory Council currently has members from five countries. There are programmes in place to translate the GOSPL documentation into Spanish, Russian and Mandarin. Regional synthesis committees have been formed in the USA, Taiwan and Japan.

Projects split

A large number of projects and sub-projects will be created and administered by the technical committees. All project materials and reports will be freely available on the web site www.gospl.org.

Multidisciplinary aspect

The GOSPL programme brings together the disciplines of silicon chip physical design, electronics systems and architectures design, computer science, mathematics and software engineering.

Timeliness

The objectives should be achievable with a five to ten year timescale. ST has spent the past four years developing the core of the GOSPL EDA toolset and it is now ready for release as a research and development platform to universities.

One risk is that universities find the GOSPL programme of little interest and it fails to accumulate a critical mass. ST started to talk to universities about GOSPL last June and the experience so far has been overwhelmingly positive. Another risk is that some insuperable technical hurdle is encountered. However, having worked on the programme for four years, ST is well aware of the technical challenges.

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