FPGA Programmer Qualifications

December 23, 2018, Reiner Hartenstein, TUK, KIT

By migration of applications from the von Neumann **Com**puter paradigm over to use the **X**puter paradigm acceleration factors as well as energy saving results by several orders of magnitude can be obtained (Fig. 1). However, the term "migration" is misleading, since we must move over to a twin paradigm solution, where both sides must be massively interconnected by complex wiring patterns. This explains the FPGA's disappointingly low market share within the microchip market (Fig. 2)[1].

Here we have two classes of qualification problems. First we have the Brick wall in the brain (fig. 3)[2] caused by typical software engineering curricula stressing mainly procedural thinking, but neglecting structural thinking as well as the twin paradigm task of complex interaction between both types of concepts. In addition to this SE qualification we also need qualifications with respect to the application area.

Fig. 1; FPGA-based Speed-up Results[1]

The worldwide highest CO2 emission comes from electric power stations[4,5]. Gigantic is the electricity consumption of all kinds of computer systems, like millions of huge data stations (often larger than a football stadium). Since we urgently need the promotion by developing a method with minimal relative changeover costs this is our case to fight against the climate disaster.[3,4]
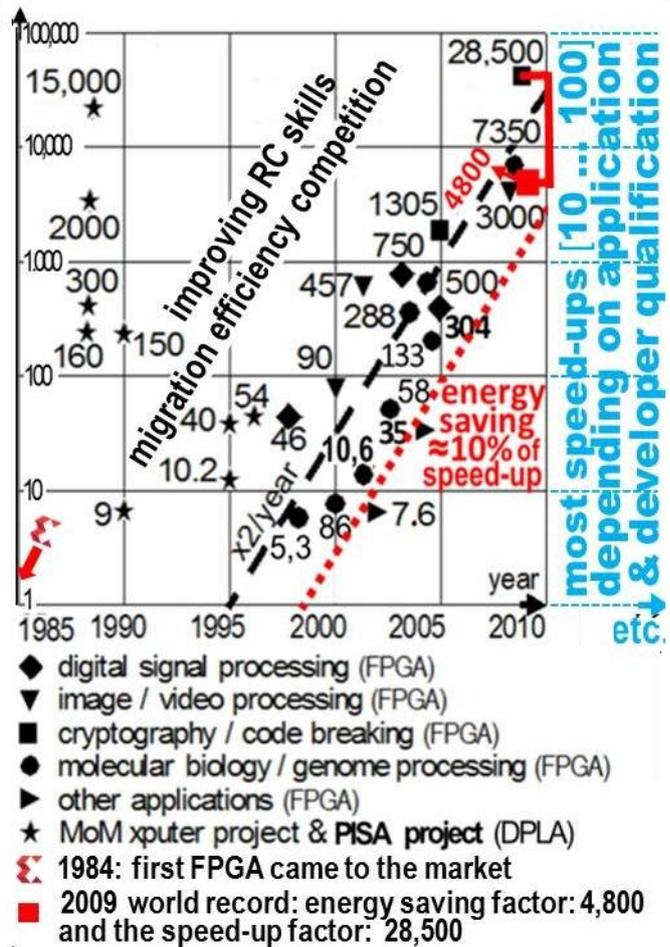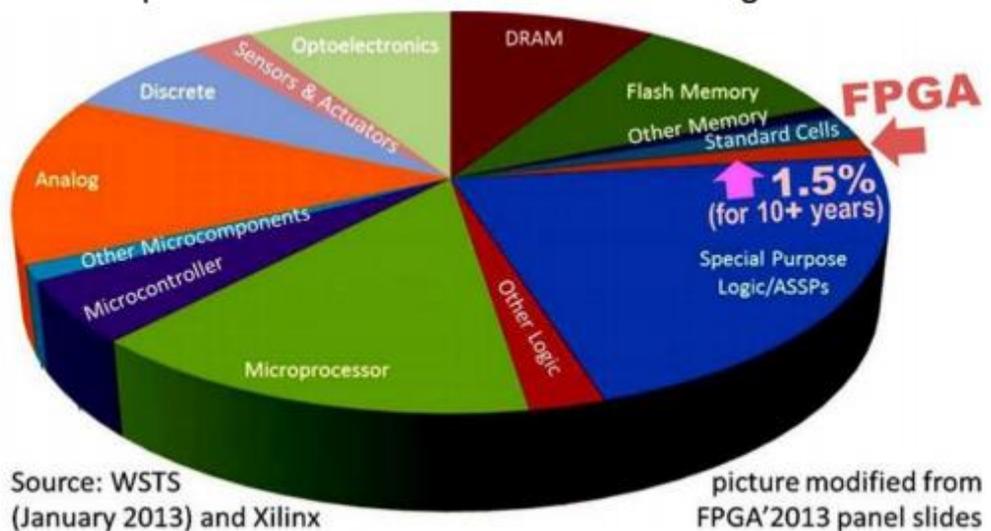

Fig. 2: The FPGA Marketing Wall -- because of qualification problems.

We should start funding a R&D project on extremely efficient server computing (EESC). The goal should be the development of a method for direct replacement of computer systems by FPGA-based systems without the need to have a major software engineering team for managing this. However, before starting this we must find out, how large is the variety of implementations for the same task: e. g. world-wide for data stations running the internet. Standardization efforts should finally help to reform this situation. It is time to clear away the dominance of the massively energy-inefficient von Neumann computer paradigm which is almost a century old.
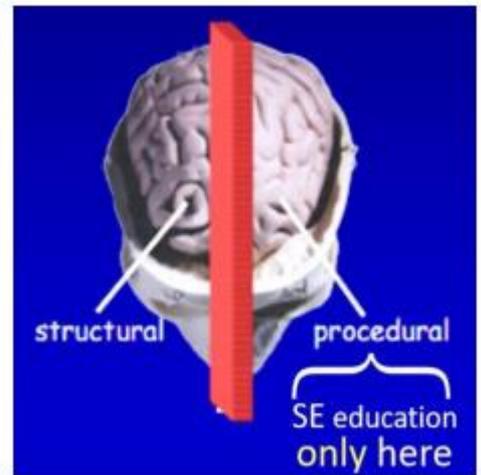

Fig. 3: Brick wall in the brain.

REFERENCES

[1] N.N: FPGA Market   click here

[2] R.H.: SE Curricula are Unqualified to Cope with the Data Avalanche;   click here

[3] R.H.: Making Taboo Subjects of the most important Methods to battle against the Climate Disaster Why do FPGAs not appear in the Media?   click here

[4] R.H.: Tabuisierung einer der wichtigsten Methoden zur Bekämpfung der Klima-Katastrophe? Warum kommen FPGAs in der Presse nicht vor?   click here